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IMMUNIZATION AGAINST DIPHTHERIA WITH ALUM-PRECIPITATED TOXOID*

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During recent years evidence has gradually been accumulating to suggest that the best and most economical method of immunizing children against diphtheria is by two suitably spaced doses of alum-precipitated toxoid (A.P.T.). Experience, however, of this method has so far been very limited. The great immunizing campaigns in the United States, Canada, and France have been carried through mainly with toxin-antitoxin mixture and with formol toxoid. Most of the early trials of A.P.T. were made by the one-dose method, which is now generally recognized to be unsatisfactory. The number of careful observations made on the two-dose method is small, and nearly all of the published records differ in either the dosage used or the interval between the doses, or both. We therefore make no apology in presenting our figures, which refer to the production of immunity, as judged by the Schick-conversion rate, in children inoculated with doses of 0.1 and 0.3 c.cm. of A.P.T. at four to six weeks' interval. If we did need an excuse, we could not do better than quote from Sir John Ledingham's address to the British Medical Association at Aberdeen in 1939, in which, discussing the antigenic value of different prophylactics, he stated: "There is no doubt that it is highly expedient that comparative trials should still go on, for it is desirable in planning extensive crusades to determine what form of antigen and what scheme of administration are best calculated to yield the most lasting immunity, due consideration being always given to the tolerability of the antigen or antigens in the interest of acceptable propaganda."

The Primary Schick Test

During the course of inoculating about 30,000 school children against diphtheria in the past two years we took the opportunity of judging the efficacy of our method by Schick-testing a proportion of the children before and after their immunizing injections. Our observations, which cover the period November, 1939, to November, 1941, were made on children in residential and non-residential schools in Oxfordshire, Berkshire, Buckinghamshire, and Wiltshire. A few pre-school children and a few adults were included, but approximately 95% of the subjects were between the ages of 5 and 16 years. The majority of the schools were of the elementary or secondary type and were situated in urban or rural districts. No large towns were visited, but most of the schools contained a proportion of evacuees from London. Apart from the evacuees, very few children had been previously immunized against diphtheria. The Schick test was carried out by inoculating 0.2 c.cm. of toxin intradermally into the left forearm and 0.2 c.cm. of heated toxin as a control into the right forearm. All reagents used for this test were prepared at the Wellcome Physiological Research Laboratories and conformed to the requirements of the regulations made under the Therapeutic Substances Act, 1925. Readings were made three to five days later. The diameter of the reaction was measured with callipers, and usually a note made of the degree of redness. Negative reactions were taken as those which, even after rubbing, showed no evidence whatever of erythema. Reactions of 1 to 5 mm. were classified as ± and, in accordance with O'Brien's (1929) recommendations, were regarded as negative. Reactions of 6 to 10, 11 to 20, 21 to 30, and 31 to 40 mm. were classified as +, ++, +++, and ++++ respectively, and were regarded as positive. Table I sets out the primary Schick reactions according to age and sex.

TABLE I.—*Frequency of Positive Reactors at Primary Schick Test according to Age and Sex*

Age in Years	Boys			Girls			Boys and Girls		
	No. Tested	No. Pos.	% Pos.	No. Tested	No. Pos.	% Pos.	No. Tested	No. Pos.	% Pos.
1 & 2	7	7	100·0	14	14	100·0	21	21	100·0
3	13	11	84·6	15	15	100·0	28	26	92·9
4	25	24	96·0	15	15	100·0	40	39	97·5
5	90	72	80·0	69	64	92·8	159	136	85·5
6	109	93	85·3	91	79	86·8	200	172	86·0
7	114	100	87·7	110	101	91·8	224	201	89·7
8	229	184	80·3	169	145	85·8	398	329	82·7
9	282	223	79·1	161	137	85·1	443	360	81·3
10	272	224	82·4	184	160	87·0	456	384	84·2
11	373	292	78·3	312	261	83·7	685	553	80·7
12	383	295	77·0	397	308	77·6	780	603	77·3
13	361	285	78·9	367	299	81·5	728	584	80·2
14	122	78	63·9	131	100	76·3	253	178	70·4
15	118	61	51·7	57	48	84·2	175	109	62·3
16	106	48	45·3	27	19	70·4	133	67	50·4
17	62	22	35·5	18	15	83·3	80	37	46·3
Over 17	85	31	36·5	13	7	53·8	98	38	38·8
Total	2,751	2,050	74·5	2,150	1,787	83·1	4,901	3,837	78·3

Difference between boys and girls: $\chi^2 = 52{\cdot}488$. $P = < 0{\cdot}000001$.

The average Schick-positive rate was 78.3%. This figure resembles that of 76.4% for children of 5 to 14 years of age at Croydon given by Lewis (1941a), but is considerably higher than that of 64.4% recorded by Ker and McGarrity (1924) for children aged 5 to 14 years in the Edinburgh City Hospital, and very much higher than that of Zingher (1923)—namely, 32.9%—for children in New York City. There were too few observations in our series to show a regularly decreasing proportion of positive reactors with

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increasing age, though the trend was obviously in this direction. It will be noted that during the statutory school age of 5 to 14 years there appeared to be very little change in the reaction rate. At 14 years and later the rates showed a rapid fall, but undue importance should not be attached to these figures, since they were heavily weighted by the inclusion of a training colony in which a considerable proportion of the boys had been previously immunized and in which diphtheria had been occurring during recent months.

Like Zingher (1923), we found that the Schick-positive rate was higher in girls than in boys. The difference in our series, as shown by the χ^2 test, was highly significant.

Intensity of the Schick Reaction

It was thought that the progressive diminution in the proportion of Schick-positive reactors with age might be reflected in a corresponding diminution in the intensity of the reactions given by those who were still Schick-positive. For this reason the intensity of the Schick reaction in relation to age has been worked out in Table II.

The number of observations made was rather smaller than in Table I, owing to the absence of accurate measurements for the first three schools we visited. The proportion of ± reactors did not seem to differ significantly in the different age groups, the average being 3.4% of the total number of children tested. Of the Schick-positive reactors 93.9% fell into the ++ and +++ groups. The number of + reactors was very small, the average being only 3.8%. If the ++, +++, and ++++ reactors are added together the following figures are obtained: 1–4 years, 98.3%; 5–8, 96.3%; 9–10, 96.5%; 11, 94.8%; 12, 96.3%; 13, 96.4%; 14–17, 97.5%. There appears to be practically no difference between the different age groups in the proportion of moderately, strongly, and very strongly positive results. In other words, a decrease in the proportion of positive Schick reactors with age did not seem to be accompanied by a corresponding decrease in the intensity of the positive reactions. The numbers, however, may have been too small to reveal such a difference, if it did exist.

Frequency of Pseudo-reactions

Reactions to the heated toxin used as a control were very few and rarely gave rise to trouble in reading the result of the Schick test. Records were available for eighteen schools. In ten of them no pseudo-reactions were observed. In the other eight schools the proportion varied from 0.2 to 6.1%. The total number recorded was 40 out of 3,392 persons tested—i.e., 1.2%. Of these, 6 were noted in children under 10 years of age and 34 in children over this age. There was no appreciable difference between the sexes. When pseudo-reactions did occur they were usually small and rarely exceeded 20 mm. in diameter. For practical purposes it seems doubtful whether it is worth while carrying out a control test on children under 10 years of age. In our experience the error introduced by such an omission would have been less than 0.2%.

Reactions to A.P.T.

Owing to pressure of other work very few observations were made on the degree of reaction following inoculation with A.P.T. into the deep subcutaneous tissue. The few opportunities we did have showed us that about half the children receiving 0.1 or 0.3 c.cm. developed some degree of redness or swelling at the site of injection within the next two days. In a small proportion a widespread area of erythema appeared, accompanied by swelling, stiffness, and tenderness. Occasionally the whole of the upper arm was affected, and very occasionally the forearm also. We ourselves met with only one subject in which a sterile abscess developed, but the medical officer of health of a district where a number of schools were immunized reported that several children had developed sterile abscesses, some of which required opening. Confidential information received from other parts of the country suggests that such an occurrence seemed to follow the use of a particular batch of A.P.T. Similar observations are recorded by McGinnes, Stebbins, and Hart (1934) and Harrison (1935) in the United States of America. Comparisons between

TABLE II.—*Intensity of Reaction at First Schick Test in Relation to Age. Schools 4 to 22*

Age in Years	Diameter of Reaction in Millimetres												Total		
	−		±1–5		+ 6–10		++ 11–20		+++ 21–30		++++ 31 and over				
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No. Tested	No. Schick-positive	% Schick-positive
1–4	2	3·2	—	—	1	1·7	38	63·3	21	35·0	—	—	62	60	96·8
5–8	94	11·8	19	2·4	26	3·8	333	48·8	305	44·7	19	2·8	796	683	85·8
9–10	107	14·3	30	4·0	21	3·4	309	50·7	253	41·5	26	4·3	746	609	81·6
11	113	18·6	19	3·1	25	5·2	256	53·7	187	39·2	9	1·9	609	477	78·3
12	137	19·7	36	5·2	19	3·6	260	49·6	237	45·2	8	1·5	697	524	75·2
13	118	18·8	24	3·8	18	3·7	267	55·2	191	39·5	8	1·7	626	484	77·3
14–17	62	20·1	4	1·3	6	2·5	132	54·3	104	42·8	1	0·4	309	243	78·6
Total	633	16·5	132	3·4	116	3·8	1,595	51·8	1,298	42·1	71	2·3	3,845	3,080	80·1

Percentage figures in − and ± columns refer to percentage of total tested.
Percentage figures in +, ++, +++, and ++++ columns refer to percentage of Schick-positive reactors only.

TABLE III.—*Comparison of Local Reactions following Inoculations of (a) 0.1 c.cm. of A.P.T. into Schick-negative Reactors; (b) 0.1 c.cm. of A.P.T. into Schick-positive Reactors; (c) a Second Inoculation of 0.3 c.cm. of A.P.T. into Schick-positive Reactors*

Group	Dose of A.P.T.	Intensity of Local Reaction										Total Showing Reactions	
		−		±		+		++		+++			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Schick-neg.	0·1 c.cm.	8	14	3	5	29	52	15	27	1	2	48/56	85·7
Schick-pos.	0·1 c.cm.	138	57·8	37	15·5	54	22·6	8	3·3	2	0·8	101/239	42·3
" "	0·3 c.cm.	106	56·1	55	29·1	19	10·1	9	4·8	—	—	83/189	43·9

− : No local reaction.
± : Area of redness not greater than 10 mm. with or without swelling.
+ : " " " 11 to 20 mm. with swelling and tenderness.
++ : " " " 21–60 mm. " " "
+++ : " " " 61 mm. and over " " "

TABLE IV.—*Schick-conversion Rates in Relation to Make and Dosage of A.P.T.*

No.	School	A.P.T.			First Schick Test			Second Schick Test				Conversion Rate %
		Maker	Dosage in c.cm.	Interval between Doses in Weeks	No. Tested	No. +	% +	Time after 2nd Dose of A.P.T. in Weeks	No. Tested	No. +	% +	
1	R.M.N.S.	A	0·1 0·3	5	238	139	58·4	8	133	4	3·0	97·0
2	Turner's Court ..	A	0·1 0·3	6	314	112	35·7	8	86	1	1·2	98·8
3	Chadlington and Spelsbury	A	0·1 0·3	4	114	87	76·3	11	57	2	3·5	96·5
4	Sutton Benger and Christian Malford	A	0·1 0·3	5	139	105	75·5	9	83	6	7·2	92·8
5	Hilmarton	A	0·1 0·3	4	56	45	80·4	12	38	0	0·0	100·0
6	Maidenhead ..	A	0·1 0·3	5	326	291	89·3	8	278	3	1·1	98·9
7	Queen's Park, Aylesbury	A	0·1 0·5	5	350	324	92·6	8	226	5	2·2	97·8
8	Wokingham ..	A	0·1 0·3	5	188	179	95·2	12	90	1	1·1	98·9
9	Purton	A	0·1 0·3	4	104	96	92·3	12	66	0	0·0	100·0
10	1 Summerfields ..	A	0·1 0·3	4	46	41	89·1	9	31	0	0·0	100·0
11	2 Summerfields ..	A	0·1 0·3	4	44	32	72·7	8	27	0	0·0	100·0
12	Cothill	A	0·1 0·3	4	80	49	61·3	8	40	0	0·0	100·0
13	Charlbury	A B1	0·1 0·3	4	266	197	74·1	9	47 45	1 14	2·1 31·1	97·9 68·9
14	Chesham	A B1	0·1 0·3	5	348	279	80·2	8	104 103	2 34	1·9 33·0	98·1 67·0
15	Amersham	A C	0·1 0·3	6	368	279	75·8	8	112 106	1 0	0·9 0·0	99·1 100·0
16	Chalfont St. Giles ..	A	0·1 0·3	4	255	202	79·2	8	63	2	3·2	96·8
		B1	0·2 0·4						77	37	48·1	51·9
17	Kidlington	A D E	0·1 0·3	4	603	509	84·4	8	67 143 144	0 3 0	0·0 2·1 0·0	100·0 97·9 100·0
18	Thame	A	0·1 0·3	4	326	288	88·4	16	78	9	11·5	88·5
		B1	0·5 1·5						75	22	29·3	70·7
19	Slough	A C D E	0·1 0·3	5	247	151	61·1	16	28 22 23 23	2 3 0 1	7·1 13·6 0·0 4·3	92·9 86·4 100·0 95·7
20	Grammar School, Aylesbury	A F	0·1 0·3	4	240	211	87·9	8	71 77	0 20	0·0 26·0	100·0 74·0
21	Sunninghill	A B2	0·1 0·3	4	225	202	89·8	8	52 89	1 2	1·9 2·2	98·1 97·8
22	Wychwood and Wychlea	A B1	0·1 0·3	4	33	25	75·8	8	9 9	0 2	0·0 22·2	100·0 77·8
	Total				4,910	3,843	78·3		2,722	178	6·5	93·5

Note.—All schools were mixed except Nos. 2, 10, 11, 12, and 19, which were for boys only, and No. 22, which was for girls only. Nos. 1, 2, and 3 were given combined active and passive immunization. The slight discrepancy between Tables I and IV in the numbers given for the primary Schick test is due to imperfect records of the age of the children.

the products of different manufacturers did not reveal any great difference in the reactions caused, though on the whole the A.P.T. prepared by maker B was less irritant than that prepared by maker A, but it was also a less efficient immunizing agent. General statements in this connexion, however, are dangerous, since there is often more difference between successive batches from a given maker than between any two individual batches of different makers.

In one school we made the observation that local reactions following the injection of 0.1 c.cm. of A.P.T. were much commoner in Schick-negative than in Schick-positive subjects. It was our usual practice to give all Schick-negative reactors a single dose of 0.3 c.cm., but in this particular school they were given 0.1 c.cm., the same dose as that received by the Schick-positive reactors. Table III records the proportion of reactions, graded according to the degree of intensity, in the two groups.

In the Schick-negative group 86% of children experienced some degree of reaction, as against only 42% in the Schick-positive group. The proportion of moderate reactors to A.P.T. was about eight times as high in the Schick-negative group. These findings are in general harmony with those of Paschlau (1939), who found that the severity of the reaction to A.P.T. corresponded fairly closely with the antitoxin titre at the time of inoculation, and with those of Jensen (1937), who states that among a group of children in Mattersburg, Austria, reactors to a single dose of A.P.T. were more than twice as frequent among those who had suffered from diphtheria as among those who had not.

Table III also contains a comparison between the reactions observed in the same group of Schick-positive children after their first dose of 0.1 c.cm. and their second dose of 0.3 c.cm. Though approximately the same proportion of children reacted to each dose, the proportion of very mild reactions was higher after the second than after the first dose.

These two sets of observations taken together seem to indicate that the severity of the reaction to A.P.T. is determined more by the degree of sensitivity of the subject than by the size of the dose used. The work of Park (1922), Zingher (1923), Zoeller (1925), and Moloney, Fraser, and Fraser (1929) suggests that reactions to heated Schick toxin, formol toxoid, or A.P.T. are usually due to the sensitization of the subject to products of the diphtheria bacillus, presumably of protein nature, other than the specific toxin itself. Thus reactions are commoner in Schick-negative than in Schick-positive subjects, in those with a history of diphtheria than in those without, and in older than in younger persons.

The conclusions to be drawn from these findings and from those recorded in the literature are that (1) in Schick-positive children under 10 years of age very few severe reactions are likely to follow a small initial dose of A.P.T.; (2) in Schick-positive children of 10 years of age or over

severe reactions will be more frequently encountered; (3) in Schick-negative children of any age and in children with a history of diphtheria severe reactions, even to 0.1 or 0.3 c.cm., are likely to be fairly common. It follows that in practice large initial doses of A.P.T. should not be given to a population without previous Schick-testing. If Schick-testing is impossible it is probably wiser to give a small initial dose, such as 0.1 or 0.2 c.cm., followed by a second dose of 0.3 to 0.5 c.cm. if the reaction to the first is comparatively mild.

Schick-conversion Rates

With the exception of the children in school No. 7 and of approximately half the children in schools Nos. 16 and 18 who received larger doses as part of a special investigation, all Schick-positive children were inoculated with 0.1 c.cm. of A.P.T. followed four to six weeks later by 0.3 c.cm. In the first five schools the inoculations were made into the same arm, but after the publication of Lewis's (1940) recommendation they were given into opposite arms. The deep subcutaneous method was chosen throughout, the left arm being used for the first dose, the right arm for the second. Children in schools Nos. 1, 2, and 3 were also inoculated with 350 to 400 units of refined antitoxin at the time of their first dose (see Fulton *et al.*, 1941). Schick-negative children were given one dose only, usually of 0.3 c.cm., of A.P.T., though, in view of the findings recorded in Table III, it might have been wiser to use a dose of only 0.1 to 0.2 c.cm. Doubtful reactors in the ± class were treated for *practical* purposes as positive, and were given two doses. Seven preparations of A.P.T. from six different makers were employed. Twelve schools were inoculated exclusively with A.P.T. supplied by maker A. In the remaining ten schools other preparations were tried, but preparation A was always given to a proportion of the children as a control. It was uncommon to use the same batch of A.P.T. from any given maker for more than one school.

Schick-testing was repeated as a rule eight to nine weeks after the second injection, but in a few schools it was delayed to twelve or sixteen weeks. The results are recorded in Table IV. In compiling this table all reactors giving a ± reaction have been counted as negative. Those at the first Schick test have therefore been omitted from the table altogether, and those at the second Schick test have been included.

Though 4,910 children were Schick-tested originally and though 3,843 of these reacted positively and were immunized, the number coming to their final Schick test was only 2,722. This fall was attributable largely to transference of children to other schools and to intercurrent disease, particularly measles and whooping-cough, not to reluctance on the part of the parents to have their children immunized or re-Schicked.

The Schick-conversion rate varied considerably with the preparation used, and to some extent with the time elapsing between the second dose and the final Schick test. There was no obvious relation between the primary Schick-positive rate and the Schick-conversion rate, as might have been expected from Dudley, May, and O'Flynn's (1934) so-called "law of immunizability." This, however, may merely mean that the stimulus we were applying was great enough to overcome any minor differences in the ability of the tissues to form antibody.

Schick-conversion Rate in Relation to Make of A.P.T.

Table V analyses the results of Table IV in relation to the preparation of A.P.T. employed.

These figures are very striking. Four preparations, A, C, D, and E, stand out prominently as giving Schick-conversion rates of 97.7 to 99.4%. B1 and F, on the other hand, proved unsatisfactory, the corresponding Schick-conversion rates being only 68.2 and 74%. When the results with B1 were first obtained it was thought that the failure might be due to insufficient dosage. Two further series of observations were therefore made to test this. In school No. 16 (Table IV) the doses were increased to 0.2 and 0.4 c.cm., and in No. 18 to 0.5 and 1.5 c.cm. The fact, however, that the Schick-conversion rates were only 51.9 and 70.7% respectively showed that not the dosage but the antigenic quality of the product was at fault. Examination revealed an Lf value of only about 13 units per c.cm. as opposed to 50 Lf units for product A. The attention of the makers was drawn to this deficiency, and they thereupon prepared a fresh product, B2. This was found to contain about 42 Lf units per c.cm. and to give a Schick-conversion rate of 97.8% when used in a dosage of 0.1 and 0.3 c.cm. (school No. 21). Further experience, however, of this product suggested that it was not altogether satisfactory and that, in spite of a relatively high initial Lf value, its mode of preparation was such as to lead to its progressive antigenic deterioration. Preparation F, like B1, had a low Lf value, and also behaved poorly in the field.

TABLE V.—*Figures extracted from Table IV comparing the Antigenic Value of A.P.T. prepared by Different Makers given in Two Doses of 0.1 and 0.3 c.cm. at 4 to 6 Weeks' Interval, as Tested by the Schick-conversion Rate 8 to 16 Weeks after the Second Injection of A.P.T.*

No. of Schools	Maker	Approximate Lf Units per c.cm.	Second Schick Test		Schick-conversion Rate %
			No. Tested	No. +	
22	A	50	1,786	40	97·8
3	B1	13	157	50	68·2
1	B2	42	89	2	97·8
2	C	23	128	3	97·7
2	D	30	166	3	98·2
2	E	47	167	1	99·4
1	F	15	77	20	74·0

One school inoculated with A was given 0·5 c.cm. for the second dose; the Schick-conversion rate of this school was 97·8%.

Schick-conversion Rate in Relation to Age and Sex

To find out whether there was any apparent difference in immunizability according to the age and sex of the subjects, Schick-conversion rates were worked out for the twenty-two schools enumerated in Table IV. Children immunized with preparations B1 and F, which gave unsatisfactory results, were omitted, since unless their age and sex distribution had been identical with that of the other children, any difference in immunizability might have been due not to a difference in age or sex response but merely to the fact that certain children had been inoculated with a product of lower immunizing efficiency. The results are recorded in Table VI.

No obvious difference was discernible between the Schick-conversion rates in girls and boys or between children of ages up to 18 years. Above this age the number of subjects tested was too small to enable a reliable figure for the Schick-conversion rate to be obtained. Reference may, however, be made to the observations of Downie and his colleagues (1941), who recorded a conversion rate of 95.7% for a group of 115 university students receiving the same dosage. On the assumption that there is a constant dose: weight ratio for optimal response, it might be argued that though 0.1 and 0.3 c.cm. are large enough for children they are too small for adults. We have no figures of our own to disprove this argument, but the observations of Zingher (1923), Anderson (1937), and Bunch, Morrow, Timmons, and Smith (1940) all suggest that adults are on the whole more difficult to immunize than children.

TABLE VI.—*Schick-conversion Rate in Relation to Age and Sex*

Age in Years	Boys			Girls			Boys and Girls		
	No. Tested	No. +	Schick-conversion Rate %	No. Tested	No. +	Schick-conversion Rate %	No. Tested	No. +	Schick-conversion Rate %
5–6	109	0	100·0	91	0	100·0	200	0	100·0
7–8	177	3	98·3	157	1	99·4	334	4	98·8
9–10	268	2	99·3	194	2	99·0	462	4	99·1
11–12	339	8	97·6	300	3	99·0	639	11	98·3
13–14	161	0	100·0	173	1	99·4	334	1	99·7
15–17	63	0	100·0	34	0	100·0	97	0	100·0
18 and over ..	20	0	100·0	1	0	(100·0)	21	0	100·0
Total	1,137	13	98·9	950	7	99·3	2,087	20	99·0

Incidentally it may be pointed out that our figures lend no support to the contention of Lewis (1941a) that children over 8 years of age, as the result of latent infections, are more readily immunizable than younger children and therefore require a smaller dosage of diphtheria prophylactic.

Schick Tests a Year after Inoculation with A.P.T. (Preparation A)

Examination of Table IV shows that with preparations A, C, D, and E the Schick-conversion rate eight to twelve weeks after the second dose of A.P.T. was almost uniformly between 97 and 100%. In a small series of children, however, in schools Nos. 18 and 19, in which re-Schicking was delayed till sixteen weeks, the conversion rates with preparations A, C, and E were rather lower, suggesting that Schick-negative reactors were beginning to relapse towards the positive state. In order to see whether this suspicion was correct, or whether the results were merely fortuitous, the children in school No. 17 at Kidlington were re-Schicked 5½ months after their second dose of A.P.T., with the following results:

Of 55 children inoculated with preparation A, 96.4% were Schick-negative
Of 111 .. .. D, 74.5% .. ..
Of 110 .. .. E, 96.4% .. ..

The conversion rates for children inoculated with preparations A and E were not significantly different from those recorded eight weeks after the second dose, but the rate for D was manifestly lower, indicating that this preparation was antigenically less potent.

Further observations were therefore made on children who had been inoculated with preparation A. Schick tests were repeated thirteen to fourteen months after the second dose of A.P.T. in three schools that had been Schick-tested twice previously—once before immunization and once eight to twelve weeks after the second dose of A.P.T. The children at Aylesbury had been given doses of 0.1 and 0.5 c.cm. of A.P.T., those at Wokingham and Purton doses of 0.1 and 0.3 c.cm. The results are shown in Table VII.

TABLE VII.—*Schick Reactions 12 to 14 Months after Second Dose of A.P.T. (Preparation A). The First Three Schools had been Schick-tested before Immunization and again 8 to 12 Weeks after the Second Dose; the Remaining Schools, all of which were at Chippenham, had never been Schick-tested*

School	Interval in Months after 2nd Dose of A.P.T.	Schick Reactions		
		No. Tested	No. +	% Schick-negative
A Aylesbury* ..	14	124	0	100·0
B Wokingham ..	13	47	0	100·0
C Purton	13	39	2	94·9
Total		86	2	97·7
D Westmead: Infants	12	57	5	91·2
E Westmead: Mixed	12	94	11	88·3
F St. Paul's: Infants	12	138	12	91·3
G Ivy Lane	12	181	18	90·1
H Senior	12	163	15	90·8
I Secondary ..	12	294	22	92·5
J Wanstead	12	39	1	97·4
Total		966	84	91·3

* Received 0·5 c.cm. for second dose.

Observed difference between schools B and C and schools D to J = 6·4%
Standard error of this difference .. .. = 1·9%
Observed difference divided by its standard error .. .. = 3·4

At Aylesbury and Wokingham none of the children was Schick-positive, and at Purton only two—one of whom was a very weak reactor. The figures are small, but they indicate that the Schick-relapse rate a year after inoculation with doses of 0.1 and 0.3 c.cm. of A.P.T. at four to six weeks' interval is of the order of 2%.

Since it might be argued that the children in these three schools had received the additional antigenic stimulus of two previous Schick-test doses of toxin, the effect of which has been shown by previous workers (O'Brien, 1926; Parish and Okell, 1928; Parish and Wright, 1938) to increase antitoxin production in sensitized persons, it was decided to examine schools that had never been previously Schick-tested. Observations were therefore made on children in seven schools at Chippenham, all of whom had received 0.1 and 0.3 c.cm. doses of A.P.T. at four weeks' interval twelve months previously. The results, which are also recorded in Table VII, show that an average of 8.7% of the children tested were Schick-positive. The reactions on the whole, however, were very weak. There were no +++ reactions among them, and 66% of the reactions that did occur were pale or very pale. Many of them had to be inspected in different lights to make sure that there was any difference at all between the toxin and the control arms, and would probably have been read by most observers as negative. It may be objected that the 91.3% Schick-negative rate obtained with children who had not been previously Schick-tested is not strictly comparable with the 97.7% Schick-conversion rate obtained with the children at Wokingham and Purton, since a certain proportion of the children at Chippenham were presumably Schick-negative at the time of inoculation. This is true, but if the proportion of initially Schick-negative children had been no greater than at Wokingham and Purton—namely, 5.8%—and if, in fact, these children had not been inoculated, then the observed Schick-negative rate of 91.3% would have been replaced by a true Schick-conversion rate of 90.8%.

Since no cases of diphtheria had occurred in any of these schools for some time prior to immunization, and since only six cases had been notified in the whole of Chippenham during the twelve months following immunization, it is probable that the immunizing effect of the A.P.T. had not been augmented by that resulting from latent infection.

These results must be regarded as very satisfactory. So far as the products of maker A are concerned, they lend no colour to the implication of Table IV that the level of immunity was falling seriously between eight and sixteen

weeks after the second dose of A.P.T. The fact, however, that the Schick-positive rate a year after inoculation was rather higher in schools which had not been previously Schick-tested than in those which had suggests that a larger second dose of A.P.T. might have given an even more favourable result.

(The second half of this paper will appear in next week's issue.)

WAR NEUROSIS

A YEAR IN A NEUROPATHIC HOSPITAL

BY

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(Concluded from page 285)

Aetiological Factors: Quantitative Estimate

The psychoneuroses may be defined as those disorders, mental and physical, which are primarily psychogenic. But it is generally agreed that other factors may play a part in their aetiology. We therefore made a quantitative estimate* of the aetiological factors to determine the proportion of (*a*) physical, (*b*) constitutional, (*c*) psychological predisposition, (*d*) psychological precipitating causes, on a percentage basis: e.g., physical, 20% ; constitutional, 30% ; psychological predisposition, 40% ; psychological precipitating causes, 10%.

In a total of 100 cases investigated the following were the percentage scores†: physical, 9.9 ; genetic, 20.6 ; psychological predisposition, 34.5 ; psychological precipitating, 35. From these figures we may assume that the physiogenic factors amounted to 30% and the psychogenic to 70%. This preponderance of the psychogenic factors in itself means very little, as it was mainly the psychoneuroses we were investigating ; we did not include any condition in which either the physical or the genetic factor amounted to over 70%, since we did not regard such cases as primarily psychoneuroses. Some cases, for instance, were purely neurological (100% physical), and it would have been misleading to include them. The *numbers of patients* in each percentage group are shown in Table IV.

TABLE IV

	Physical	Genetic	Psychological Predisposition	Psychological Precipitating
100% ..				
90% ..			1	
80% ..			5	6
70% ..			2	7
60% ..		1	9	6
50% ..	3		13	11
40% ..		24	13	7
30% ..	1	9	16	24
20% ..	22	26	24	18
10% ..	40	19	14	17
0% ..	34	21	3	4
Total ..	100	100	100	100

* It will be noted that this does not represent the *absolute amount* of each factor in our cases, but only the ratio between the various aetiological factors, since one patient may be much more ill than another, and his 20%, shall we say, of psychological predisposition may represent the same amount of illness as the 30% of a man less ill. But the *relative* amount will remain the same, and it is precisely this relative estimate of the part played by the various factors which is here under review. It is also admittedly difficult to compare the amount of a psychological as compared with a physical factor, since the basis of comparison cannot be the same. But as a rough estimate the figures are not without significance.

† These figures were taken in two groups, in each of which the percentages were almost identical, thus confirming their accuracy.

The following comments may be made on these figures:

1. In no case was there only one factor present—e.g., none was marked 100% psychological precipitation, as we might have expected if the traumatic experience had been considered to be the only one operative. One case, however, came near to it with 95% psychological predisposition—obviously an old chronic neurotic. Eight had over 70% psychological predisposition, and nineteen had over 70% precipitating factor. These may, then, be regarded as the effective cause in each of these cases.

2. The most important conclusion to be drawn from these figures is the *multiple nature of the aetiology*. In more than a third of the cases all four factors played a part ; in only three were there psychogenic factors alone. This supports the view of those who hold that in considering the psychoneuroses we must take into account the whole personality in all its aspects—physical, constitutional, and psychogenic. In practice, however, one or another of these factors may be so important that to treat it alone may be enough to produce a "cure."

3. *Physical.*—In more than a third (34%) of the cases there was no physical contributing factor (and all our cases were examined by the medical specialist). Where it did exist it was small, for in 74 out of 100 cases the physical factor was 10% or under, and in total amount it represented only 9.9% of the whole. This suggests that the physical factor plays but a small part in the aetiology of the psychoneuroses. Obviously the toxic theory of the neuroses does not gain much support from these figures.

4. The *constitutional* factor was a more important one than the physical in the aetiology of these conditions—namely, 21%. In only 21 out of 100 cases was it absent. This figure is surprisingly large, but it may be accounted for by the fact, already mentioned, that there were included in the investigation not only the psychoneuroses, which in terms of the definition are psychogenic, but also a few cases of psychopathic personality, in which the constitutional element plays a prominent part. These cases would account for some of the higher percentages in the genetic scale—e.g., 25 cases were 40% and over.

5. The *predisposing psychological factors* were important, constituting 34% of the whole. They were found in all but 3 cases out of 100. These figures, together with the fact that in only 21 out of the 100 cases was no genetic or constitutional predisposition recorded, substantiate the conclusions already drawn from the larger group of 326 cases (in which only 18% showed no predisposition) as to the significance of the predisposing factors in these cases. If we add the genetic and psychological predisposition together they amount to 55% of the whole aetiological causes (i.e., in quantity, not number of cases).

6. The *precipitating psychological factors* constituted 35% of the whole, and formed the highest group of all. They were concerned in the aetiology of 96 out of the 100 cases, and were completely absent in only 4 ; but in some of them the precipitating factor was nothing else than being in the Army. But the figures also show that the precipitating factor, though the largest, cannot be regarded as the only or all-important one, for the predisposing psychological factor was nearly as great (34%), and the whole predisposition—constitutional and psychological (55%)—was considerably greater. This is also proved by the fact that in 63% of the cases the precipitating factor was 30% or under, suggesting only a mild aggravation.

Onset and Precipitating Factors (262 Cases)

These cases were divided into those with :

(*a*) *No definite precipitation ;* cases in which the patient was no worse than when he came into the Army or developed his illness without ascribing this to any specific condition in Army life. (18% of cases.) They were mostly cases of chronic neurosis.

(*b*) *Gradual onset ;* those which were due to specific conditions in Army life, to conditions of service such as strain in the retreat from France, coast-watching, etc., but which took some time to develop (more than two or three days). (41%.) These may be regarded as *subacute*.

(*c*) *Sudden onset:* that is, those in which the onset of the condition developed within two or three days and was due to severe circumstances, but not amounting to the "traumatic." (18%.) These, with the next group, are the *acute* cases.

(*d*) The "*traumatic*"; a term used here arbitrarily of those who met with some serious traumatic experience such as being blown up or buried, or concussed from a cycle accident, and who were physically affected. (23%.) (*Note:* A traumatic case may more properly be defined as one in which "the precipitating circumstance of an objective nature is the most important factor in the production of a neurotic disorder," as distinct from one in which the objective condition may be of little consequence, the main factor being the already existing internal conflict within the person himself.)

We may say that the acute cases (traumatic and sudden onset) total 41% (which corresponds to the Ag++ and Att. 40%), the subacute 41%, and the chronic 18%.

By far the largest group consisted of those of "gradual onset," patients made worse by specific conditions of Army life or of active service. It suggests that, in producing neurosis, constant strain has a worse effect upon people than sudden emergencies. We cannot exclude the probability that in many of the cases described as "traumatic" and "sudden" the patients may have been working up to this condition owing to fatigue and strain precipitated by acute circumstances.

These facts and figures relating to onset, and those previously referring to predisposition, help to settle the interesting and important question whether objective conditions in adult life alone can produce a neurosis. Some writers hold that, given conditions that are serious enough, any man would develop hysterical symptoms. Our figures and our experience do not support this, but suggest, on the contrary, that, without a predisposition, circumstances, however bad, do not or rarely produce a neurosis. Otherwise how are we to account for the fact that some soldiers went through four years of fighting in the last war, had experiences of being blown up apparently as severe as the others, and emerged stronger than when they entered? Indeed, a man may be nearly killed, as by severe concussion, and yet not develop a neurosis. The mentally healthy man whose personality is based on a stable constitution and healthy integration of his personality in childhood does not break down with neurosis; in those who do, deeper investigation reveals predisposing or contributory factors in nearly every case. This is supported by the fact that in treating officers and others in private after the last war, when we had the opportunity to do so in more thorough fashion than was possible in a military hospital, we invariably found predisposing factors, such as early fears which made the soldier compensate by trying to prove that he was a brave man to produce a false impression of fearlessness. The stimulation of his repressed fear precipitated the breakdown.

Even in severe traumatic cases the traumatic experiences are themselves not necessarily to be regarded as causative, but are often simply tags on which the patient conveniently projects his previously existing problems. Indeed, the trauma of being blown up may act as a welcome climax to a series of horrifying experiences upon which the patient can project his troubles, in the same way as the hysteric projects his internal distress on to a physical injury. But there are few patients with so little predisposition as to be negligible from the practical point of view, and in most acute cases the treatment of the traumatic experience, especially by abreaction, is sufficient to produce a "cure." Nevertheless the medical officer, in treating these traumatic cases, should be alive to the personal problems of the patient, which may be as relevant to the breakdown as the traumatic experience which precipitated it.

Treatment

The treatment used in this hospital is mainly analytic in the broad sense, and essentially abreactive (the release of repressed emotion), which is of particular value in traumatic cases with amnesia. Persuasion, suggestion, reconditioning (e.g., by amplified sound records of actual air raids, a form of treatment which was initiated in this hospital by Major McLaughlin and Major Millar: *British Medical Journal*, 1941, **2**, 158), and general rehabilitation, especially by creative work at the Taunton School of Art, all played their part. This is not the place to discuss the methods and results of these forms of treatment, but two points are worth mentioning.

Pentothal narcosis has been used as a means of abreaction for the release of repressed emotion. It is easy to administer and is more effective than chloroform, which was employed in the last war because of its more prolonged action in the twilight stage. It is useful when patients object to hypnosis, but this is so rare as to be immaterial. Its chief value is when a patient "blocks" in analysis or when he gets stuck in recovering from an amnesia, in that it releases the block and opens up the mind to abreaction when that would have been otherwise impossible.

Does pentothal, then, supplant the use of hypnosis and free association? That has not been our experience. There are as many who object to "the needle" as to hypnosis. Nor is pentothal in every case successful in releasing emotions and amnesias; indeed, free association and hypnosis may succeed where pentothal fails. Furthermore, pentothal cannot be used frequently because of its toxic effects, whereas free association and hypnosis can be used as often as possible. Even when pentothal succeeds the material obtained has usually to be followed up by free association, especially as it is often forgotten again, and needs to be recovered by subsequent free association. Moreover, the cure usually comes about not merely by the mechanical release of repressed emotion but by the readjustment of these experiences and reassociation with the rest of the mind. For these reasons free association and hypno-analysis are a far more delicate instrument not only for discovering the subtle and often very complex changes in the mind which have contributed to the breakdown, but also for adjusting the mind to deal with these morbid moods and emotions. Compared with this, the use of drugs is a crude though sometimes necessary assault upon so sensitive an organism as the mind, and, in spite of its abreactive value, often leaves the more basic moral problems unsolved. Pentothal should therefore be regarded as an adjuvant and not as a substitute for these other types of treatment: it would be a pity if the simplicity of the more mechanical methods should lure the student of psychotherapy from the more delicate psychological methods. Both have their specific uses, and both techniques should be mastered.

The second question, just referred to, and one strongly debated during the last war, was whether catharsis alone, the mere release of emotion, is itself sufficient to produce beneficial results. The evidence seems to show that reassociation with the rest of the mind of the material released is necessary, whether this readjustment is deliberate or automatic. But in some cases it appears as if the mere release of emotion, whether under hypnosis or under pentothal, even when the experience is not remembered afterwards, does itself to some extent relieve tension and produce an improvement in the patient's condition. If this is so, it may account for the almost universal use of alcohol even in the most primitive races of mankind; for that drug may act not merely as a *means of escape* from the problems of

life and a temporary means of forgetting our worries, but as an actual *therapeutic release of suppressed emotion,* and of the crude and primitive impulses which have been thwarted, thus bringing about a state of well-being even though there is a complete amnesia of all that took place in the bout and in spite of the unpleasant physical after-effects.

Prolonged narcosis (by somnifen, paraldehyde, phenobarbitone, etc.) has been used with varying success, but more experience and more research are necessary to determine in what type of case it can be most appropriately used. My own impression, with little experience to go upon, is that it is most successful in reactive cases, depression or anxiety, in which the patient is exhausted mentally and physically, and in which there is no dissociation marking a true neurosis. Certainly it has a most striking effect in many cases. It seems then to serve the same function as sleep; but whereas ordinary sleep in these patients is so often disturbed by dreams, the deeper and more prolonged narcosis provides more complete rest. Nevertheless, prolonged sleep for two or three days under hypnosis, where this is possible, is even more effective, not only because there are no toxic effects but because in that state one can reinforce the effect of the sleep itself by giving suggestions of perfect rest of mind in dreamless sleep.

Results of Treatment

The function of a military hospital, as we conceive it, is primarily to treat *war casualties,* and to treat these whether they are likely to be fit for further service or not, and if they are incapacitated for further military service to render them as fit as possible for civilian life. In other words, we should deal with psychiatric casualties in precisely the same way as we should deal with a soldier who has had an amputation of the leg as a result of war injury.

A number of patients were "cured," and by this much-abused term we mean that the patient was rid of his grosser neurotic symptoms, that he could be returned to duty or to work in civil life, and that it is not anticipated that he would relapse unless under exceptional strain. Of these there were 15%. The majority of cases were regarded as "improved"—by which we mean *materially* improved as a result of specific treatment, and not merely the degree of improvement to be expected from simple residence in hospital. Of these there were 43%. The only patients recorded as having got worse were the psychotics, transferred to a mental hospital, and others who for disciplinary reasons were returned to their units, some of whom were genuine cases of psychopathic personality. They were very few, and were unsuitable for treatment. Forty-two per cent. were considered unsuitable for treatment on account of constitutional or too deep-seated (e.g., obsessional) psychological disorders.

Return to Duty: Disposal

The policy adopted in the last war—namely, that all the cases diagnosed "shell-shock" (now "war neurosis") were automatically boarded out after receiving the requisite treatment—has not been the rule in this war owing to the urgent need for man-power. It was enforced on the principle that while soldiers who had once broken down with war neuroses could be rendered fit enough to carry on with their civilian duties adequately, most of them broke down if submitted to the further stress of war conditions. This made their return to duty too hazardous, both in their own interest and in that of their comrades, for if they became casualties they not only required others to look after them but affected the morale of the soldiers about them. It was therefore not from any motives of sympathy or sentiment that the soldier was excused from being sent back to the line, but the stern demands of necessity.

This rule of boarding out the neurotic in the last war had a beneficial effect on treatment, especially of the true war casualties; for, being relieved of the fear of returning to the line, the patient co-operated in treatment, was anxious to get well, and the results were good.* In this war we find that during treatment many cases improve rapidly and then suddenly cease to improve, the reason being that, faced with the prospect of being sent back to the hell from which they had so narrowly escaped, they are filled with a new anxiety which arrests their recovery. Assured that they will not be sent back to the line, they improve rapidly.

The "Annexure" Scheme introduced in 1941, which permits us to send such men to be employed and even trained for civilian occupations in the Army, was most welcome both for maintaining morale in the hospital and for keeping the men in the Service. But even this scheme did not absorb as many men as we expected, and the larger number had to be boarded out, because, as originally mentioned, many of them broke down with no further stimulus than ordinary Army life. The argument that under the present conditions the civilian worker is as much exposed to bomb fire as the soldier, and therefore there is no difference in doing jobs in the Army and the same jobs in civil life, does not hold, for several reasons. In the first place he is still under discipline, and whereas the soldier in an air raid has to "stay put," the civilian can move where he likes: he can change his environment. This freedom to escape if he wants to gives expression to the instinct of flight and therefore relieves the tension of anxiety. Again, the fear in many men is not so much the fear of bombs as the fear of being afraid, the fear of failing in their duty; and this does not obsess civilians so much. Further, with many, as with evacuee children, the most marked fear is not bombs but "separation anxiety." The anxiety which patients feel about those at home being bombed is a most pronounced feature of this war as compared with the last, and, we understand, spreads to the Middle East. The feeling of not being near to help their wives and children in danger is a source of worry which the patient discharged to his own home does not feel. It is true, therefore, that at home the physical fear of a bomb remains, but the accessory fears are largely abolished, so that the chances of avoiding a breakdown even in a blitz at home are so much greater. But every psychiatrist, of course, is on his guard against the man who would naturally prefer his £8 a week in a civilian job to a civilian job in the Army on Army pay. The soldier is unable to appreciate why there should be this inequality of pay. But in fact there has been very little trouble on this score.

An investigation into *the relation of predisposition and aggravation to return to duty* (100 cases) indicates that the more recent the causes the better the diagnosis. The best results were obtained in the true war neuroses, however severe the trauma. A bad prognosis depended more on predisposing factors than on precipitating factors; and, further, of the predisposing causes, better results were obtained with those with psychological than those with constitutional predisposition, nearly twice as many of the former being returned to duty (the total numbers of each group in hospital being about equal). Not one patient with both constitutional and psychological predisposition was returned to duty.

* A record of the follow-up of 100 patients taken eighteen months after discharge from hospital is to be found in the *Medical Annual* of 1921, p. 373.

Follow-up

The figures of patients returned to duty may be completely misleading; they may prove the efficiency of treatment, or may merely reflect the medical officer's standards and principles. In our experience, even in the same hospital one medical officer returns to duty a man whom another would never regard as fit to return. Nor is a follow-up altogether reliable, for whilst it may reveal the relapses of the too optimistic doctor just mentioned, it fails to take into account the type of case *received* by the different hospitals, which depends on the Command psychiatrist and the type of case he considers appropriate for treatment. A hospital which is hospitable to early psychotics will show poorer returns than one which refuses them. But although the follow-up is of limited use in comparing one hospital with another, it should, if taken over the country as a whole, act as a guide as to the efficacy of returning the hospital neurotic to his unit. Our figures in the follow-up, for what they are worth, are about 20% returned to duty*; and 60% of those returned remained satisfactory after three months; the rest proved unsatisfactory. If it is considered that this figure shows a poor result, as indeed it does, it is to be borne in mind that on medical recruiting boards the methods for detecting neuroses are so much less adequate than in the case of other diseases, and that therefore to a large extent we, like the Command specialists, are doing the work of the boards and discharging men who should never have been admitted to the Army. The figures above show 42% of our cases as unsuitable, even after selection by the Command specialists, who have already discharged a large number as obviously unsuitable.

Courses of Instruction

The expert recognition of the neuroses at an early stage is an urgent necessity not only to exclude those who are unfit for service and to send those requiring treatment as early as possible, but to prevent others breaking down. Much valuable time and space in hospitals which should be reserved for the true war neuroses would thus be saved; moreover, hospitalization may render them unfit for their civilian occupation, which may be just as necessary to the war effort as soldiering. The loss of man-power on this score alone has been very considerable.

The training of psychiatrists in psychopathology and the diagnosis of the neuroses has therefore been perhaps the most important function of the 41st General Hospital during its year of work. Three courses each of six weeks' duration have been held, and almost all the twenty medical officers so trained have been appointed to psychiatric posts. But the ultimate necessity for training the *regimental officer* to diagnose the neuroses and to understand them (although he may not be called upon to treat them) is a no less important consideration for the future.

Synopsis

The article discusses the explanations of the relative frequency of anxiety states in this war as compared with conversion hysteria, as revealed in the table of diagnosis. The importance of predisposing factors, constitutional and psychological, even in the war neurosis is proved by the data. The problem of aggravation by and attributability to war service is also discussed. The patient's previous adaptation to life and his position in the family, and other aetiological factors such as the type of onset, lead to a discussion of the types of treatment employed, with their results, including return to duty.

I wish to thank Colonel G. Will, formerly commanding officer of the 41st General Hospital, for permission to publish this report, and also my colleagues, especially Major E. Miller and Major Maberly, who have provided most of the clinical data.

* These figures were taken before the "Annexure" Scheme was introduced, and therefore refer to general duty.

SULPHAPYRIDINE IN OPHTHALMIA NEONATORUM

BY

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The promise of sulphanilamide in the treatment of ophthalmia neonatorum gained early and wide recognition. Newman (1937), Fernández and Fernández (1938), Perry (1938), among American observers, and Magitot *et al.* (1938), Dollfus *et al.* (1938), Pagès and Duguet (1938), among French observers, reported good results with sulphanilamide, whilst a sulphanilamide derivative, uleron, was employed by Best (1938) and Jess (1938) in Germany and by Szinegh (1939) in Hungary. With the introduction of sulphapyridine attention was concentrated on this drug because of its selective action on the gonococcus, and numerous observers have reported highly gratifying results. These refer to relatively small numbers of cases, the largest being a series of 120 patients with gonococcal conjunctivitis reported by Lewis (1941). In this country the value of sulphapyridine has been stressed by Michie and Webster (1938), Moffett (1940), Clancy (1941), and Somerville-Large (1941). The medical officer of health for Glasgow in his annual reports for 1938 and 1939 noted that the result of the treatment of gonococcal ophthalmia neonatorum with sulphapyridine "was dramatic. Within twenty-four hours the clinical condition of the eyes had cleared up. . . . Most [indoor] cases needed only two or three days' treatment of the drug, and the average stay in hospital for a gonococcal case has now been reduced from about eight weeks to ten days." More recent experience has shown sulphapyridine to be equally effective in all forms of ophthalmia neonatorum (Somerville-Large, 1941). The dosage recommended is generally 0.125 gm. by mouth three or four times daily, and local treatment has become almost superfluous.

Several observers have reported on the use of sulphanilamide or sulphapyridine locally (Rein and Tibbetts, 1939; Bruens, 1940; Pillat, 1940; Guyton, 1941; Lewis, 1941; Panneton, 1941). It would appear that oral administration gives distinctly better results.

Personal Observations

As a war measure, St. Margaret's Hospital, which dealt with the in-patient treatment of cases of ophthalmia neonatorum in the London County Council area, was transferred to White Oak Hospital. For the period September 1, 1939, to December 31, 1941, 322 cases were admitted. At the beginning the routine local treatment previously carried out at St. Margaret's was continued, but towards the end of 1939 treatment by sulphapyridine (M & B 693) was instituted, at first tentatively and subsequently as a routine measure. Of the total of 322 cases, 273 were treated by sulphapyridine by mouth, most of the remaining 49 constituting the earlier group treated by local medication. The incidence of gonococcal infection was 27.3%, there being 89 gonococci-positive cases and 233 gonococci-negative. Thick purulent discharge was present in 93 cases (28.7%); 36 of these were gonococci-positive and 57 gonococci-negative. The sex distribution of the affected infants was approximately equal—168 males and 154 females. There was a rather high proportion with infec-

tion confined to one eye—98 cases (44 right eye, 54 left eye) in this series of 322—that is, 30.5%.

Sulphapyridine was used irrespective of the causal organism, and clinically there appeared to be no obvious specially selective action on gonococci. The following table shows comparative results of treatment with and without sulphapyridine, and also makes it clear that the therapeutic effect of sulphapyridine is not confined to ophthalmia neonatorum of gonococcal origin.

Table of Comparative Results

Clinical Cure	Local Treatment (Classical Methods)			General Sulphapyridine Treatment		
	Gonococci-positive	Gonococci-negative	Total	Gonococci-positive	Gonococci-negative	Total
Within 8 days ..	2	5	7 (15·2%)	43	126	169 (61·9%)
„ 8–30 „ ..	6	21	27 (58·7%)	21	67	88 (32·2%)
More than 30 „ ..	7	5	12 (26·1%)	9	7	16† (5·9%)
Total	15	31	46*	73	200	273

* Three cases treated by newer local methods are excluded from this total.
† Including relapses after an apparent clinical cure.

Though the series of cases treated by local methods is small it may be taken as fairly representative of the results obtained by these older procedures, for the data reflect the experience of most clinicians. The contrast shown by the sulphapyridine series is striking: 61.9% of cases were cured clinically within eight days by sulphapyridine administration, against 15.2% by local methods; and 5.9% of cases required prolonged treatment of more than thirty days, against 26.1%. The fact that as many rapid recoveries under sulphapyridine are observed in non-gonococcal cases (126 out of 200, or 63%, recoveries within eight days) as in gonococcal infections (43 out of 73, or 58.9%) is noteworthy, as sulphapyridine is regarded as a specific against the gonococcus and but feebly active against the staphylococcus and most of the other organisms commonly seen in non-gonococcal ophthalmia neonatorum.

The differential incidence of organisms other than gonococci is of some interest. Pus cells only, without any organisms in the smear or culture, occurred 53 times, and the remaining 180 cases showed the following organisms:

Staphylococcus		111
Staphylococci	56	
„ and diphtheroids	25	
Staphylococcus albus	17	
„ aureus	13	
Other cocci		20
Gram-positive cocci	6	
Meningococci	4	
Pneumococci	3	
Streptococcus haemolyticus	2	
„ viridans	1	
Micrococcus catarrhalis	2	
„ tetragenus	2	
Bacilli		49
Diphtheroids	20	
Koch-Weeks's	8	
Coliform	6	
Gram-positive	3	
Gram-negative	3	
Xerosis	3	
Morax-Axenfeld's	3	
Hoffmann's	2	
Friedländer's	1	

The present evidence shows that sulphapyridine is as effective against staphylococcal ophthalmia neonatorum as against gonococcal infection. It also appears to be effective against the other and less common causal organisms, for such few cases as have proved refractory to treatment were gonococcal in character. Delay in starting sulphapyridine treatment does not seem to influence its efficacy: 83 cases (63 non-gonococcal and 20 gonococcal) first received sulphapyridine treatment after the infection had been established for more than eight days; these cases responded as well as less-established infections did.

In assessing the value of sulphapyridine treatment, the gratifying data shown in the table must be regarded as an understatement, for many of these cases received a dosage which is now recognized as less than the optimum. With further experience fuller doses are being used, and the response to treatment is better than the table would indicate. Previously, an eighth of a tablet (0.062 gm.) was given four times daily, and this was subsequently raised to doses of one-sixth of a tablet. At the present an initial dose of half a tablet (0.25 gm.) is given, followed by doses of a quarter tablet (0.125 gm.) every four hours, day and night, so that the total twenty-four-hourly dose is 0.875 gm. on the first day and 0.75 gm. on the subsequent days. With the smaller doses it was found that a clinical cure could be effected with 2 to 2½ gm. over six to eight days.

No complications of any consequence were seen in the present series. Occasionally cyanosis developed, and in two instances there were attacks of dyspnoea. In these cases administration was continued after missing one or two doses. As a rule tolerance is good, as shown by the physical comfort of the babies and the regular gain in weight. In two cases in which administration of the drug had to be prolonged the blood count remained normal. In a few instances there was a relapse after an apparent clinical cure of the infection, and sulphapyridine treatment had to be instituted again.

Corneal complications were not observed during treatment. Seven gonococci-negative and 13 gonococci-positive patients who had hazy corneae on admission were discharged with normal corneae. Four gonococci-negative and 7 gonococci-positive cases admitted with corneal ulceration improved rapidly under treatment.

Management of Cases of Ophthalmia Neonatorum

On admission a swab of the pus is taken, both for a smear preparation and for culture. The eyes are then irrigated with a bland lotion, such as 0.5% saline solution. Guttae atropinae sulphas 1% and drops of medicinal paraffin are instilled as a routine measure in all cases, and half a tablet of sulphapyridine (0.25 gm.) crushed into powder is given by mouth in a teaspoonful of water or milk. Sulphapyridine administration is continued in doses of 0.125 gm. every four hours, day and night, until twenty-four hours after a clinical cure is obtained. Usually this means treatment for three to five days, with a total dosage of about 2½ to 4 gm. Local treatment consists of three-hourly irrigation with saline solution during the first day in cases with profuse discharge; as a rule there is no need for further irrigation on the subsequent days. After irrigation medicinal paraffin is instilled as a precaution against the sticking together of the lids. Atropine is instilled three times daily in cases with corneal haze or ulceration.

Under this treatment swelling of the lids generally subsides within twelve hours after admission; purulent discharge disappears within twenty-four hours, so that a threatening purulent ophthalmia becomes a simple conjunctivitis giving no anxiety. The eyes are either dry or very nearly so within seventy-two hours.

Discussion

The view often expressed in recent literature that the advent of the sulphonamides has revolutionized the treatment of ophthalmia neonatorum is no exaggeration, and there is validity in the opinion expressed by Somerville-Large that "failure to administer the sulphonamide group of drugs immediately ophthalmia neonatorum is recog-

nized amounts to criminal negligence." There is now ample evidence that sulphapyridine cures with dramatic rapidity, making unnecessary prolonged hospitalization, such procedures as external canthotomy, and constant or frequent local treatment. With the duration of the affection cut short, the dreaded corneal complications of ophthalmia neonatorum have now become almost a matter of historical interest. It is, however, still essential that infants with ophthalmia neonatorum should receive in-patient treatment, for the new therapy requires care as meticulous as was the nursing necessitated by the classical methods. If it was true that the management of a case of gonococcal ophthalmia by local therapy was one of the severest tests of nursing, it is also now true that the treatment of a case by present-day methods is a test of a practitioner's capacity to apply medical knowledge with efficiency and precision. It is possible that eventually a satisfactory local therapy with sulphonamides will be evolved, but the classical methods of local treatment with or without such adjuvants as shock therapy have no longer any place in the treatment of ophthalmia neonatorum, especially as the sulphonamides have proved satisfactory not only for gonococcal ophthalmia but also for the other forms of ophthalmia neonatorum.

Summary

An account is given of 273 cases of ophthalmia neonatorum treated with sulphapyridine, and of a control group of 46 cases treated by the classical methods of local therapy.

The results obtained by sulphapyridine justify the description of this method as a revolutionary advance.

Sulphapyridine has proved as effective in non-gonococcal ophthalmia as in the gonococcal variety.

The routine employed in the ophthalmia neonatorum unit of White Oak (L.C.C.) Hospital is described.

We are indebted to the Medical Officer of Health for the London County Council for permission to publish these findings, and to the Matron and Sister Condon of White Oak Hospital for their collaboration.

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K. L. Pickrell of the Department of Surgery, Johns Hopkins Hospital (*Johns Hopk. Hosp. Bull.*, 1941, **69**, 217), in a preliminary note records the results obtained in the treatment of 115 burnt patients with 3% sulphadiazine in 8% triethanolamine. The results have been so good that it has been decided to continue the use of this method in the treatment of all burns at the Johns Hopkins Hospital for the time being. A patient whose burns are severe enough to need treatment in hospital is placed at once on sterile sheets in the accident room and treatment for shock is immediately instituted. Cultures are taken from the burnt areas. While the surgeon is scrubbing up, the nurse sprays the burnt areas with the sulphadiazine mixture. The burnt areas are not washed or cleansed in any other way. Spraying is continued every hour on the first day, every two hours on the second day, every three hours on the third day, and every four hours on the fourth day. Pickrell points out that sulphadiazine can be safely used in and around the eyes with impunity. It can be detected in the blood within some hours after having been sprayed on the surface of the burn.

SULPHAPYRIDINE AS AN AID TO THE POST-OPERATIVE TREATMENT OF LARYNGEAL DIPHTHERIA ASSOCIATED WITH MEASLES

BY

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The association of diphtheria with measles is always a serious matter, and still more so if the disease invades the larynx, rendering operative treatment necessary for the relief of obstructive symptoms. My own experience in the past has been that most of these cases succumb to a fatal bronchopneumonia, but encouraging results in the treatment of measles and its complications with sulphapyridine (M & B 693) led me to try this form of therapy in the following four cases, all of which recovered. The occurrence of laryngeal diphtheria and measles is not common in the limited area served by this hospital; but the results in this small series of cases suggest that this drug has a sufficiently favourable prophylactic effect to warrant its trial in similar cases.

Notes on Four Successful Cases

Case 1

A girl 2 years old was admitted on January 28, 1941, with a diagnosis of measles and bronchopneumonia. The rash was first noticed by her parents four days before admission, and the doctor was summoned because of their alarm at her "noisy and rapid breathing." Examination showed a well-nourished child. Her temperature was 102°, the pulse 150, and respirations 60. She had a croupy cough, hoarseness, and well-marked stridor. There was very slight recession, but no cyanosis or acute distress, and the trunk and face showed evidence of a fading morbilliform rash. The throat was congested but quite clean. There were coarse rales over both sides of the chest but no localized dullness. A diagnosis of measles, bronchopneumonia, and ? laryngeal diphtheria was made. As the child was restless she was given 2 drachms of paraldehyde in saline per rectum, 28,000 units of diphtheria antitoxin intramuscularly, and oxygen through a nasal tube. In addition she received 1 gramme of sulphapyridine orally, followed by 0.5 gramme every four hours. Two hours later her general condition was fairly good, but the stridor was more pronounced and she was still rather restless. Half a grain of luminal was prescribed and she was placed in a steam tent. Four hours later there was less stridor and her colour was still satisfactory. At 10 p.m. the same day the improvement had been maintained, and a further half-grain of luminal was all that was required to give her a good night. Next day she was very much better, sitting up in bed playing. There was still some stridor, and the signs in her chest remained much the same as on admission. The temperature had fallen to 99.4° and the pulse and respirations to 130 and 32 respectively.

On the 30th there was hardly any stridor, but slight cyanosis was present and she was rather drowsy. In view of this the sulphapyridine was reduced to 0.5 gramme six-hourly. The temperature was normal, but the pulse and respirations remained round about 130 and 30.

On the morning of the 31st—that is, three days after admission—her general condition was much worse. Recession and stridor had reappeared, she was still cyanosed, and the chest was full of coarse rales. Half a gramme of sulphapyridine was again given four hourly. Her general condition grew steadily worse and she showed all the physical signs of progressing respiratory obstruction, so that at 2 p.m. a tracheotomy was performed. This gave her immediate relief, resulting in rapid improvement of her colour and general condition. Half a gramme of the drug was continued at four-hourly intervals until the tube was removed three days later, and shortly after this the physical signs in her chest cleared up, the wound healed rapidly, and she was discharged from hospital on March 7, five and a half weeks after admission.

Case II

A boy 5 years old was admitted on October 2, 1940, suffering from laryngeal diphtheria. He had been ill for six days at home, and had moderate dyspnoea with recession, a hoarse voice, marked stridor, and a croupy cough. The throat was congested, and old separating membrane was present on both tonsils. The cervical glands were enlarged and his general condition was very poor: temperature 99°, pulse 120, respirations 24. A late faucial and laryngeal diphtheria was diagnosed, and 60,000 units of diphtheria antitoxin was given intramuscularly, the foot of his bed being raised on low blocks. Shortly after admission he had an attack of acute dyspnoea, followed by another an hour later. His general condition deteriorated rapidly, and marked recession, aphonia, and early cyanosis heralded the onset of acute respiratory obstruction. Tracheotomy was performed two hours after admission, and although his condition remained poor his distress was immediately relieved. An attempt was made to remove the tube in forty-eight hours, but without success, and further intervention was postponed until the following day, when this was successfully accomplished. On the 6th, four days after admission, his temperature rose to 101°, the wound became inflamed, and mild stridor reappeared. No obvious cause could be found for these symptoms, but it was thought they might be due to sepsis, and 0.75 gramme of sulphapyridine was administered four-hourly. The next day his temperature was still 101° and Koplik's spots were seen, followed in a few hours by an early morbilliform rash. On the 8th the rash was fully developed. On the 9th his temperature fell to normal and his general condition improved. Sulphapyridine was reduced to 0.5 gramme six-hourly and discontinued twenty-four hours later. His convalescence was interrupted by an acute otitis media with a purulent discharge from the left ear, which responded satisfactorily to further administration of sulphapyridine and local treatment. Later on he developed a blood-stained nasal discharge with excoriation of the nostrils and an impetiginous eruption on the face, which cleared up after a further 16,000 units of diphtheria antitoxin had been given after desensitization. He was discharged from hospital on December 16, 1940, eleven weeks after admission.

Case III

A girl aged 7 was admitted on July 29, 1940, suffering from laryngeal diphtheria. She had been attended by her doctor for an attack of measles, which started six days before admission. She had complained of a sore throat two days previously. When first examined she was in a distressed condition, with temperature 100°, pulse 120, and respirations 28. There was marked recession, pallor, and oft-recurring attacks of severe dyspnoea. Both tonsils were covered with membrane, which had begun to creep over the soft palate on the right side. The cervical glands were moderately enlarged. The trunk showed generalized staining consistent with a recent attack of measles. She was given 1 c.cm. of coramine intramuscularly and an immediate tracheotomy was performed. Her urgent dyspnoea was relieved at once, and after she had settled down 48,000 units of diphtheria antitoxin was given intramuscularly.

She passed a comfortable night and coughed up several shreds of membrane. Sulphapyridine, 0.75 gramme, was administered orally every four hours. During the day she showed signs of becoming "dry," but otherwise her condition was satisfactory.

At 10.40 on the morning of the 31st I was summoned to see her. She had developed a sudden acute dyspnoea and cyanosis, with general collapse. The tube was taken away, membrane forceps were inserted, and a cast of the trachea 2½ inches long was removed. Coramine was given and the tube reinserted, and by midday her condition had considerably improved. Thereafter her immediate progress was satisfactory. The tube was removed on the evening of August 2 and the sulphapyridine discontinued three days later. A severe diphtheritic myocarditis delayed her discharge until October 7, ten weeks after admission.

Case IV

Another girl aged 7 was sent into the hospital on January 6, 1941, suffering from measles and laryngeal diphtheria. The rash was noticed three days before admission, and her appearance was indicative of a recent attack, as she showed a well-marked fading morbilliform eruption. Her temperature was 98°, pulse 108, and respirations 36.

Examination revealed membrane all over the posterior pharyngeal wall, and well-marked stridor, recession, and aphonia were present. 60,000 units of diphtheria antitoxin was given intramuscularly, and 0.75 gramme of sulphapyridine administered orally every four hours. At 10 o'clock the same evening the obstructive symptoms became more urgent, recession was increased, and she became very distressed. Paraldehyde, 3 drachms in four and a half ounces of saline, was given rectally, and half an hour later tracheotomy was performed, relief being immediate. Her progress remained satisfactory, and the tube was removed on the 9th, three days after admission. The following day the sulphapyridine was reduced to 0.5 gramme six-hourly, being discontinued four days later. Her recovery was delayed by a diphtheritic myocarditis, and she was discharged on March 29, nearly twelve weeks after admission.

I have to thank Dr. T. Peirson, medical officer of health for the city of Plymouth, for permission to submit these case histories for publication.

A CASE OF CONGENITAL OSTEOPSATHYROSIS

WITH THE GENEALOGICAL TREE OF THE FAMILY

BY

F. AUSTIN HENLEY, M.B., B.S.

Surgeon Lieutenant, R.N.V.R.

A man aged 47 was admitted to hospital with biliary colic. He had deep blue sclerotics, was small in stature, and, unlike the usual sufferers from gall-stones, was very thin. On further investigation a family history of multiple fractures of the long bones was elicited, and in view of its completeness it was decided to place the case on record.

The Genealogical Table

Generations* 1st 2nd 3rd 4th	Age	Blue Sclerotics	Fractures	Site of Fracture
M		+	+	Femur twice at 62. Died of pneumonia
M †		+	+	Forearm at 62. Dead
M	47	+	+	Several of all limbs before school age
M	26	+	+	Several of upper and lower limbs before 7
M	24			No fractures at all
M	23			" " " "
F	21			" " " "
M	44	+	+	Two before school age; also at 19 and 42
M	17	+	+	Femur twice at 10
M	12			No fractures
M	14			" "
M	16	+	+	Several fractures before 7
F	9			No fractures
FM	3			" "
M	45			" "
F	41			" "
F	43			" "
F	38	+	+	Leg 4 times before 6th year. Humerus twice. Clavicle at 13th, humerus at 33rd year
F	3	+	+	Humerus in 3rd year
F		+	+	Died at 2 from pneumonia following fractured femur
M		+	+	History of several fractures in childhood and old age. Dead
M	28	+	+	Had several fractures as a child, before 7th year
F	6	+	+	Not known
M	4	+	+	" "
F	25	+	+	Many before 7th year
S				
M	22	+	+	Several before 7th year
M	16			No fractures
M	15			" "
S				
S				
S				
M				No fractures. Dead.
F				" " "

* The letters in black type denote members affected. † The present case. S = stillborn.

Conclusions

Males appear to be affected more commonly, in a ratio of 3 to 2.

All those with blue sclerotics have sustained fractures.

The most common age for fractures is pre-school age, and up till the seventh year. There are very few cases between the seventh and fifteenth years, seldom in adult life, but beyond middle age they again become more frequent. In this instance the grandfather, father, and uncle had fractures in their declining years.

The man whose case is here recorded is known to have biliary colic, with calculi, and the grandfather is reputed to have had either biliary or renal colic, with calculi. Also, by repute, the family suffer from "gravel." Their private doctor, however, cannot bear out this statement, although he says it may be prevalent in other branches of the family.

Most of the subjects are under average height, of stocky build, and over average weight.

The condition appears to be transmitted through both males and females, provided that one of the parents possesses the characteristics. Children who are quite normal at birth do not acquire the condition, nor do their subsequent offspring, provided, of course, that the other parent is normal.

Sufferers from fragilitas ossium and normal children seem to be equally distributed in any one family. It is rather noteworthy that where the condition was present in the mother the child in one case was stillborn and in the other was a female child subject to the disease.

The percentage of stillbirths in this family is 11.

Finally, the cause of the sclerotics being blue is the thinness of the sclera, which, according to a case examined microscopically (Parsons), was one-third the usual thickness; the cornea was thinner than normal and Bowman's capsule was absent. *X*-ray examination of the long bones showed an osteoporosis, with a widening of the medullary cavity at the expense of the cortex. The skull, although flattened and with an increased bitemporal diameter, was completely ossified. The ears were pointed, completing the elf-like appearance which is typical of this condition.

The aetiology of fragilitas ossium is unknown.

I am indebted to Surgeon Rear Admiral R. F. Cory and Dr. E. A. Cockayne for their kind assistance, and to Dr. George Hendry of Buckie for much of the information.

Medical Memoranda

A Case of "Influenzal" Meningitis

"The rarity of what it may be less misleading to call 'Pfeiffer bacillus meningitis' will always make records of therapeutic tests difficult to collect" (*Lancet*, 1940, **1**, 463). Recovery from "influenzal" meningitis after sulphapyridine therapy has been reported by Roche and Caughey (1939) and Sakula (1940), among others. Untreated, the infection has a mortality rate of about 95%. The case described below developed meningeal signs after fourteen days, and these were preceded by a generalized infection, the main features being pyrexia, albuminuria, acute gastro-enteritis, and a purulent infection of the ankle-joint from which the *Haemophilus influenzae* was recovered.

Case Report

The patient, a male infant aged 15 months, was first seen on February 11, 1941. The child had acute gastro-enteritis, which subsided in three days. Four days later one of its ankles became swollen and painful, the urine was loaded with albumin, and the infant had a temperature ranging from 102° to 103°. The ankle became less painful, but the swelling persisted; it had no inflammatory signs and appeared to be a "cold abscess." On February 25 the child developed a peculiar staring expression, the oculomotor nerve evidently being involved. There was now no evidence of albuminuria, and no change could be detected in the retinae or disks. On the 27th neck rigidity appeared and a lumbar puncture was performed, turbid fluid escaping under considerable pressure.

Treatment with sulphapyridine was started; 1 gramme in eight divided doses was given daily. There was an improvement in the clinical condition: the pyrexia subsided, and the child took its feeds well and was no longer restless; the neck rigidity persisted, however. On March 3 lumbar puncture was repeated. The fluid was now under normal pressure but was still turbid. On the same day a purulent exudate was aspirated from the ankle-joint. On the following day, however, the child's condition rapidly deteriorated, the temperature rose to 102°, and the patient died.

Laboratory Findings

Cerebrospinal Fluid examined on February 27.—Turbid fluid under considerable pressure. Total cell count, 600 per c.mm.; 97% polymorphonuclear leucocytes, 3% lymphocytes. A direct smear showed large numbers of Gram-negative bacilli, and culture on blood agar gave a heavy growth of *H. influenzae*.

Cerebrospinal Fluid examined on March 3.—Turbid fluid under normal pressure. No significant change in total or differential cell count. A direct smear showed organisms considerably reduced in number, but culture still gave a heavy growth of *H. influenzae*. Indole, which is sometimes found in the cerebrospinal fluid in cases of influenzal meningitis, was absent in both specimens.

Pus from Ankle-joint (March 3).—*H. influenzae* was present in smear and isolated in pure culture.

The strain of *H. influenzae* was examined by Dr. Edith Straker at the London School of Hygiene, and was found to be of antigenic Type B (Pittman), the type most often found in influenzal meningitis in infants.

Comment

In spite of the late administration and the comparatively small total dosage of sulphapyridine in this case the temporary clinical improvement, the reduction of pressure in the C.S.F., and the considerable reduction in the number of organisms present in the direct smear of the C.S.F. would suggest that the drug had a beneficial effect and is worthy of further trial in this condition.

We would like to record our appreciation of the advice and helpful criticism given us by the late Dr. W. M. Scott and by Dr. Edith Straker, and our thanks to Dr. S. G. Budd of Newcastle Emlyn for furnishing us with the clinical details.

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E. B. Cram (*Med. Ann. D.C.*, 1941, **10**, 39) states that during the last four years 4,000 persons in Washington, D.C., were examined for threadworms by the NIH swab technique. The parasite was found in 42% of 2,900 white persons and in 13% of 1,100 negroes. Information relative to the familial extent of infestation was obtained in 320 families in which 1,525 persons were examined with the following results. In the 286 white families threadworms were found in 72% of the children and 36% of the adults, and in the 34 negro families in 51% of the children and only 7% of the adults. In the white families multiple cases were the rule, as in only 70, or one out of 4, was the infestation with oxyuris confined to a single case; whereas in the remaining 216 families there was an average of 3.4 positive cases per family.

Reviews

ELECTROCARDIOGRAPHY

Electrocardiography, including an Atlas of Electrocardiograms. By Louis N. Katz, M.D. (Pp. 580; illustrated. 45s. net.) London: Henry Kimpton. 1941.

Exercises in Electrocardiographic Interpretation. By Louis N. Katz, M.D. (Pp. 222; illustrated. 25s. net.) London: Henry Kimpton. 1941.

Dr. Louis N. Katz, in his treatise on electrocardiography, claims that the greatest utility of the electrocardiogram now lies in the aid it gives in the evaluation of the adequacy of the coronary circulation; there have been many advances in this field in the last ten years, and the principal purpose of his work has therefore been to deal extensively with them. The book falls into three sections, the first comprising chapters on the theory of electrocardiography, the second containing a systematic description of electrocardiographic contour, and the third dealing with the electrocardiogram in the arrhythmias. Throughout the text there is a profusion of reproductions of electrocardiograms (806 in all). The principal substance of the second section concerns, of course, infarction of the heart. Dr. Katz, in describing the interpretation of the electrocardiogram in this condition, recognizes four phases—the ST stage, the waxing T, the waning T, and the stabilized record; while these changes commonly occur in the course of one to three months, they may be complete in three weeks or may even still be in progress one year after the acute occlusion. He gives illustrations of the lag in the appearance of electrocardiographic abnormalities and insists that a normal record early after a heart attack does not rule out coronary thrombosis. A further important principle which emerges is that any evolution observed in serial electrocardiograms (even if it is non-specific) may be considered in the absence of other cause as suggestive or confirmatory evidence of recent coronary thrombosis. The author has, as would be expected, adopted the joint recommendations on standardization of precordial leads of the subcommittee of the American Heart Association and the Cardiac Society of Great Britain and Ireland; as many workers are now employing multiple precordial leads and the use of these is rapidly increasing, the supplementary report of the committee of the American Heart Association has also been included. Dr. Katz holds that at least two chest leads should be employed; he himself pairs a distant electrode on the left leg with chest electrodes in the fourth intercostal space in the left parasternal line and with a chest electrode in the fifth intercostal space in the mid-clavicular line. According to the subtitle of this work it includes also an atlas of electrocardiograms; this is represented in the sense that, while a reference to each record is made in the text, each electrocardiogram bears a legend which gives a succinct account of the principal clinical features and the electrocardiographic abnormalities to be observed; in the important section on coronary disease many groups of serial records are provided, including some of the T_a and T_p varieties. The third section of the work also contains much valuable and interesting material; it does not confine itself merely to the presentation of records of the various arrhythmias, but sections are given to such matters as the clinical features and aetiology of auricular fibrillation, the mechanism of fibrillation and flutter, and the various grades of block between the auricles and ventricles. Dr. Katz's treatise, which transparently is the outcome of much thought and labour, will surely gain the attention of all cardiologists; it will also find an important place among the reference books of general clinicians and advanced students. The technical excellence of the electrocardiograms and of their reproduction and the general presentation of the work leave no room for criticism.

Exercises in Electrocardiographic Interpretation has been compiled by Dr. Katz as a companion volume to his *Electrocardiography*. It presupposes a basic knowledge of cardiography, but the author feels that it will nevertheless be of value to those who are beginning to study electrocardiographic interpretation as well as to those who have had some experience. The book opens with an introductory section on the approach to an unknown electrocardiogram, and this is followed by a collection of records for elucidation. The system of placing the reproduction of the electrocardiogram on the right-hand page and the descriptive remarks on the left lends itself to the use of the book as a means of exercise in the analysis of tracings. Each page of interpretation includes brief paragraphs of description of the record, its interpretation, the clinical story, and the correlation of the curves with the pathological condition present. Dr. Katz admits, as do most cardiologists, that between the obviously abnormal electrocardiogram and the patently normal record there is a great range of doubtful appearances. The more normal electrocardiograms are those which, though not complying with the accepted standards of the great majority of normal records, yet deviate very little from them; on the other hand there are the records which, though they bear none of the stigmata of obvious morbid change, have certain features never seen in normal tracings. It is of course in this field of doubtful interpretation that experience tells, and it is on account of these manifestations that only those who habitually deal with electrocardiograms should attempt to make interpretations which may have an important influence on the treatment and the prognosis of the patient. Those who intend to use this book to improve their knowledge of cardiographic interpretation will find it of immense value if they make a point of committing themselves as to diagnosis before they read the legend. Even the physician who has had wide experience in electrocardiography cannot fail to widen his outlook and extend his knowledge by a study of the 189 interesting and beautiful records in this volume.

ANKYLOSING SPONDYLITIS

A Monograph on Adolescent Spondylitis or Ankylosing Spondylitis. The Early Diagnosis and its Treatment by Wide-field X-ray Irradiation. By S. Gilbert Scott, M.R.C.S., L.R.C.P., F.F.R., D.M.R.E. (Pp. 132; illustrated. 15s. net.) London: Oxford University Press 1942.

The author of this monograph held decided views on the aetiology and pathology of ankylosing spondylitis which are not generally accepted by practitioners with wide experience of the disease. He asserts that the sacro-iliac joints always present the earliest changes, only, however, to be detected by an expert radiologist, and that from five to seven years may elapse before the spine is affected, which is by no means always the case. The importance of mechanical factors in producing changes which are more easily seen in these joints than in others more difficult of examination is entirely overlooked. The statement that swimming is often an important cause certainly cannot be accepted.

In treatment the use of plaster shells and spinal supports is condemned, and on this point orthopaedic surgeons will strongly disagree. The only method of treatment worthy of consideration in the author's opinion is "wide-field *x*-ray therapy." Even if the value and freedom from ill effects of this procedure were generally admitted, which is

not the case, it is accessible to few, while other methods which are more readily available and give as good or better results are not mentioned.

As a guide to the general practitioner the book cannot be recommended, but to the specialist it will be found of interest though provocative of emphatic disagreement on many points. The illustrations of *x*-ray appearances are excellent and worthy of careful study.

A PAMPHLET ON LICE

Lice. By John Smart, Ph.D. British Museum (Natural History). Economic Series, No. 2A. (Pp. 32. 6d.) London: Printed by order of the Trustees of the British Museum.

In peacetime and in war the louse is always with us. In Britain the body louse would appear in peacetime to have been but a minor nuisance and existing among only a small proportion of the population; the head louse was widespread, but again its presence was usually considered as a hygienic rather than an important medical problem. The absence of typhus and other louse-borne diseases from Britain in recent years (no case of typhus has been notified since 1919) prevented the medical profession from being greatly concerned with these insects. But war, with rumours of widespread typhus in other parts of the world and the possibility of a breakdown in hygienic conditions which would be ideal for the spread of these parasites in this country, has again drawn attention to the need for vigilance, lest lice should spread rapidly and become a menace to the health of the nation.

This pamphlet, which has been entirely rewritten by Dr. John Smart, describes briefly and clearly the important details of the biology and anatomy of the lice which infest man and gives details of the diseases (typhus, trench fever, relapsing fever) which are carried by lice. Modern data on the incidence of the parasites are given, together with practical details concerning methods of prevention and eradication. References are included to draw attention to other more detailed and larger works on the subject. The pamphlet is easiiy readable and should be valuable to all concerned with public health problems at the present time.

YEARBOOK OF GENERAL MEDICINE

The 1941 Year Book of General Medicine. Edited by George F. Dick, M.D., J. Burns Amberson, jun., M.D., George R. Minot, M.D., F.R.C.P., William B. Castle, M.D., William D. Stroud, M.D., George B. Eusterman, M.D. (Pp. 848. $3.00 or 16s. 6d.) Chicago: The Year Book Publishers; London: H. K. Lewis and Co., Ltd. 1941.

The names of the Editorial Committee responsible for *The 1941 Year Book of General Medicine* are a guarantee of good harvesting in a rich field, the value of which is enhanced by occasional brief comments winnowing the grain from the chaff. We can only allude to a few articles of topical interest. The work of Prof. Florey and his colleagues on penicillin as a chemotherapeutic agent is duly recorded (p. 138), and there is a careful assessment of the comparative merits of the various sulphonamides, including sulphadiazine, with special reference to pneumonia (p. 191). Mention should be made of the discussion of "cystic" disease of the lung by C. B. Pierce (p. 313), which the editors regard as one of the most rational analyses of the subject that has appeared. He prefers to speak of the "congenital" type as developmental, and regards it as very rare. Most so-called cystic diseases are acquired, bronchopneumonia and purulent bronchitis being the most important causes. A glycerin basis for an inhalant for asthma is advocated as producing a more lasting mist (p. 308). As is to be expected in wartime, attention is paid to methods of transfusion (p. 316), including the substitution of purified bovine albumin solutions for plasma, and the use of isinglass as a transfusion fluid. Instances are given of renal insufficiency following transfusion even when blood grouping had apparently been correct. Successful treatment of cases of subacute bacterial endocarditis with sulphapyridine combined with intravenous T.A.B. vaccine is reported (p. 502). There are interesting developments of Goldblatt's work on hypertension, including treatment by tyrosinase (p. 492). This enzyme was chosen because it has a specific oxidative action on the most powerful pressor substances, which all contain the phenolic nucleus. That blood pressure can thus be lowered seems clear, and in some instances clinical benefit followed, though severe allergic reactions developed in four out of twenty cases; in this group the blood pressure returned to its former level when treatment was stopped. The risk of rapidly lowering blood pressure is also seen in treatment by kidney extracts (p. 491). In one instance a patient having a urea clearance only 5% of normal was thus treated; his pressure fell sharply, "but death from uraemia occurred." We should substitute the word "consequently" for the word "but." The British experience of dyspepsia in the Army is quoted (p. 695) and various treatments for peptic ulcer are discussed, including that of the aluminium hydroxide drip method (p. 730). Treatment by histidine receives its final quietus (p. 737). The article from Canada on the national importance of the retention of vitamins in wheat is highly topical; surely never have scientific evidence and popular preference been more sharply divided.

Notes on Books

Last September a Conference on Science and World Order was held by the British Association's Division for the Social and International Relations of Science. The full proceedings of this conference have now been published from Burlington House as No. 5 of Volume II of the *Advancement of Science* at the price of 5s. The text and index occupy 120 pages, printed in clear type and double columns. The conference attracted much attention, and many will wish to read this complete account of it.

The seventy-fourth annual volume of *Whitakers Almanack*, for 1942, has now appeared in three volumes—at 15s., and at 10s., and an abridged edition in paper covers at 5s. Delay in publication was caused by the destruction of the printing and binding works in London by enemy action early last year. The need for resetting almost the whole of the book gave an opportunity to change the type and improve the general look of the pages in accordance with modern printing practice. The events of the second year of the war are fully chronicled in this edition, and the new Departments that have been set up occupy many of the thousand pages of which the complete edition is composed. The editorial offices of *Whitaker* are now at 13, Bedford Square, W.C.1.

Preparations and Appliances

A DIAGNOSTIC AGENT

Messrs. Burroughs Wellcome and Co. have now provided quinizarin compound for the investigation of the extent of injuries to cutaneous nerves. The compound is a mixture containing 28% of quinizarin 2:6-disulphonic acid, which is dusted on the skin of the affected part. The subject is then placed in a radiant-heat bath, and where sweating occurs the skin takes on a dark blue-violet colour. Various zones can then be mapped out indicating (*a*) complete loss of sweating and sensation, (*b*) partial loss of sensation and diminished sweating, (*c*) and the complete area of distribution of a nerve. The method of using quinizarin, which is simple, has been described by L. Guttmann (*J. Neurol. Psychiat.*, New Ser., **3**, 1940, 197).

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WAR NEUROSES

The experience of 1914-18 brought home the importance of psychological causes for casualties and invaliding among combatant troops. From the medical point of view the last war may have been said to have begun with the neurologists, who believed in cerebral commotion as a cause of war neuroses, and to have ended with the psychiatrists, who saw that personal factors, especially fear and anxiety and conflict, lay behind the symptoms in most cases. Progress, however, as Julian Huxley once remarked of the crab, is lateral, and not so directly forwards as would seem to be indicated by the common sense of previous experience. Not much was done in the early days of this war to ensure that the recruitment of potential psychological misfits should be limited as far as possible. Such attention as was given to the matter was concentrated on the detection of them after they came into the Service and on arrangements for their treatment, the latter apparently on the assumption that they would really be casualties of the war in the true sense. Hence such observations as J. A. Hadfield's—writing in this and last week's *Journal* of his year's experience in the 41st General Hospital—that "hundreds of neurotics are recruited who are not, never have been, and never will be, fit to be soldiers." It is true that the detection of potential war neurotics at the recruiting medical examination is often not simple. Furthermore, the neurotic in peacetime is not always the same person as the war neurotic. Hadfield remarks that a considerable proportion of the psychoneurotic patients seen by him and his colleagues were well enough adjusted to the Army as such and wanted to remain there. Nevertheless, as he says, "the staff of special hospitals who have the treatment of so-called war neurotics are to a large extent doing the work of the Boards in discharging men who should never have been admitted to the Army." In spite of technical difficulties there is a proportion who could be eliminated by Recruiting Boards if the latter could be persuaded to pay as much attention to the mental as they do to the physical aspects of the men before them. This is partly a question of time, but partly also, it must be confessed, of a still inadequate curriculum in psychological medicine. Anything psychological or psychiatric is still looked at a little askance by a number of doctors, to their own loss and to the loss of the country as a whole. Our enemies do not seem to make this mistake; from beginning to end the psychological aspects of warfare are given a prominent place in German military organization.

Apart from attempts to eliminate confirmed cases of psychoneuroses and psychopathy of the sort which are unlikely to make soldierly material, there is much to be done by means of vocational selection. This is the joint responsibility of the psychologist and the psychiatrist, in order not only to prevent the neurosis of the square peg in the round hole but to promote efficiency in general. Vocational selection is now being comprehensively tackled in the Army and to some degree in the other Services. In addition there is the "Annexure" Scheme, by which psychoneurotic and psychopathic individuals can be moved into special units where attention is paid both to their vocational capabilities and to their general difficulty in adaptation to their fellow-men and to Army life. Even with these resources, however, a large number of those who reached the 41st General Hospital had to be boarded out. It is possible—and it is a point worth investigating—that the number of timid people who cannot stand exposure to danger, and of dependent folk who cannot tolerate separation from their homes (two classes that make up a large proportion of those who have to be boarded out), is a reflection on our national education in the broad sense and on British family life as it has been lived in many instances in recent years. The Germans believe that courage can be cultivated, even in seemingly timid persons, and that proper education may develop this. It is a little late to do that now for those who are already adult in years, but with the young it is different. There are signs that the war is bringing this home to the authorities and that constructive measures may be taken. Thus Mr. Wolfenden, late Director of Pre-entry Training, Air Training Corps, said that the lesson of the Service Training Corps was that "young people wanted not merely entertainment and relaxation, but hard work, heroic appeal, and a definite goal."

If we cannot wholly exclude psychoneurotic and psychopathic individuals from the Services, we can at least avoid manufacturing neuroses or making them worse. Accurate and speedy diagnosis is required, but unfortunately there is a habit, not confined to Service medical officers but occurring also in the Emergency Medical Service, of delaying diagnosis unnecessarily long by the modern tendency to rely less and less on "clinical sense and clinical science" and more and more on laboratory techniques. This seems to be a liability of the bureaucratic type of organization. From fear of committing himself to a diagnosis of psychological illness the medical officer asks for more and more tests and tries to pass the responsibility on to someone else. The result of this and other failings is that the average period in Hadfield's series between the time when the man first went sick and when he reached the special hospital was no less than seven and a half months. Meanwhile symptoms had become engrained, uncertainty engendered in the patient's mind, and cure made much more difficult. A man who was able to get on moderately well in civil life before he was recruited may, as a result of this process, have become a liability to the community on his discharge. The last war emphasized the importance of mental conflict; this war has on the whole emphasized the importance of predisposition, and especially of constitutional predisposition. One of the tasks of the future is to discover means of detecting this in a much higher proportion of cases than is possible now. Once such predisposed individuals are

recognized in the Services they should be dealt with as rapidly as possible. The reluctance of the medical officer to discharge such people to civil life is understandable, as the Medical Service is thus apt to become an easy channel to civilian freedom and better pay. The differential rewards of civilian and military services in the present war organization do not help us here, but it is unfair to commanding officers to send such people back to their units, where they may be a burden and even a menace. The institution of a special Labour Corps has long been advocated as avoiding both these evils, but experience with the "Annexure" Scheme suggests this is not a complete solution. Nor is treatment very satisfactory: only 15% of the men of the 41st General Hospital were regarded as cured and as unlikely to break down again except under exceptional strain. In addition, therefore, to more adequate methods of diagnosis at the time of recruitment, more speedy diagnosis once they have broken down, and treatment for those who can benefit from it, there will always be necessary some organization, which does not yet exist on any satisfactory scale, to take care of the rehabilitation of these people on their return to civil life. Otherwise the country will be presented with a group of pensioners who are casualties of the recruiting organization rather than of the war itself.

GASTRECTOMY

Although gastrectomy has been increasingly practised by surgeons all over the world since Billroth carried out the first in 1881, the place of this operation in the treatment of diseases of the stomach and duodenum is still a matter for controversy. The reasons for this are: (1) even in experienced hands gastrectomy carries a high mortality—a very high one in inexperienced hands; (2) there is difference of opinion on the indications for operation; (3) now that more is known of the functions of the stomach, pylorus, and duodenum the effect of treatment of gastro-duodenal disease upon the general body economy must be cautiously assessed; and (4) gastrectomy has tended only too often to become a battle-ground between medical and surgical interests. For some conditions, however, it is the only operation which offers any real prospect of cure, or even the slightest possibility of cure—for example, in cancer of the stomach and some forms of peptic ulcer. Any attempt, as in a recent symposium,[1] to assess present knowledge and experience is therefore welcome. The various resections carried out on the stomach are either Billroth I or Billroth II operations, or modifications of these, or total gastrectomy. For these operations to be justified they must be reasonably safe, functionally satisfactory, and must give protection against the disease for which they were carried out. The death rate for total gastrectomy is about 40%—that is, more than double the figure for the partial operation, which offers as much prospect of ultimate cure. In diffuse growths the more extensive operation is, of course, the only possible one. The cure rate in cancer of the stomach is still extremely low, but it must be remembered that often the surgeon first sees the patients when the disease has already reached an advanced stage. In many cases partial gastrectomy is only a palliative measure, as death from metastasis is far less distressing than death from either gastric obstruction or starvation. The treatment of peptic ulceration is primarily medical, but there is some general agreement on the indications for surgical intervention, though less certainty about those for any particular operative procedure. During the past twenty years, especially in America, the tendency has been towards more radical methods in gastric surgery. Whatever the objections to gastrectomy in the treatment of peptic ulceration, it does at least remove the ulcer and the ulcer-bearing area of the stomach and duodenum, and it does offer the greatest possible insurance against a recurrence of the disease. The place of gastrectomy in the treatment of this type of ulcer is now fairly established, but its place in the treatment of duodenal lesions is not. Gastrectomy depends for its success partly on the subsequent reduction of gastric acidity; thus Finsterer's hypothesis that where there is no acid there will be no ulcer becomes a plea for the more extensive types of operation.

Chester Jones discusses the relation between gastrectomy and the anaemias. In man, pernicious anaemia rarely follows any type of gastrectomy, though a few cases have been recorded. All the evidence suggests that the intrinsic factor is formed at other sites besides the stomach and the duodenum. It may be that pernicious anaemia develops only when there are also widespread extragastric lesions in the alimentary tract. On the other hand, it is certain that in both man and animal a hypochromic anaemia often follows gastrectomy, but it readily responds to treatment by iron. This type of anaemia is especially likely to occur in women on whom gastrectomy has been performed at or near the time of the menopause. The general position is summarized by Chester Jones as follows: "It is apparent that major gastric surgery—subtotal or total gastrectomy—may be performed without any great fear of undue consequence as far as the factor of normal haematopoiesis is concerned."

Schindler reports gastroscopic observations in a series of fifty-four patients on whom gastric resection had been performed. Unfortunately this series contained very few normal patients: most of them came under observation on account of some digestive disturbance and thus represent the failures rather than the successes of gastrectomy. After gastrectomy the new stoma is usually seen easily with the gastroscope, and in some cases the instrument may be passed into the jejunum. Generally the stoma was found to be rigid after all types of resection, but in the four normal cases in the series it showed evidence of rhythmic activity. One of the points stressed by Schindler is that if pathological changes arise in the stomach, then the gastroscopic picture of them is a constantly changing one. In one of the recorded cases gastroscopy was carried out on no fewer than forty occasions and there was great variation in the gastroscopic pictures.

The effects of gastrectomy in animals, which are discussed in a paper by Ivy, must be considered in relation to the functions of the stomach—as a reservoir, in trituration, in digestion, in relation to haematopoiesis, and the bacteriostatic, bactericidal, and coabsorptive functions. After gastrectomy the dog ceases to bolt its food,

[1] *Amer. J. digest. Dis.*, 1940, **7**, 495.

while the rat, the pig, and the monkey all eat less at a time. With the loss of the triturating function large food masses pass unchanged through the digestive tract. In the alimentary tract there is always a large safety margin for the digestive processes, and much of the work of the stomach can be carried out by a small intestine. But it is found that after gastrectomy dogs need some 25 to 50% more milk, meat, and bread than they did before. Gastrectomized pigs do not normally put on fat, and they also need iron. There is no experimental evidence of pernicious anaemia after gastric resection, and any anaemia which occurs responds readily to iron. The loss of the bacteriostatic and bactericidal action of hydrochloric acid may be the cause of the summer enteritis from which some gastrectomized animals suffer. Finally, experiments show that in early life the stomach plays an important part in calcium metabolism, gastrectomized puppies developing osteoporosis, deformities, and fractures. The collected evidence on gastrectomy may shed much further light upon the functions and diseases of the stomach and duodenum, and eventually this operation may become merely a historical milestone in our treatment of this group of diseases.

INFECTION AND REINFECTION IN TUBERCULOSIS

The recent correspondence in our columns has brought once more to the fore the subject of "endogenous and exogenous reinfection." Some months ago[1] we suggested that the use of the term "endogenous exacerbation" was more accurate than "endogenous reinfection," and therefore preferable. There is evidence that both endogenous exacerbation and exogenous reinfection are responsible for the development of bronchogenic tuberculosis (the common type of pulmonary tuberculosis in adults). The evidence may be summarized as follows. Morbid anatomical studies have shown that exacerbation occurs both in the hilar component of the primary complex and in the apical residua of the post-primary dissemination (Wurms,[2] Pagel,[3] Arnstein[4]). Exogenous reinfection in man is not demonstrable in the same way. It has been produced in rabbits (Pagel[5]), but the conditions of experiment—very massive intratracheal dosage—do not correspond with those existing in man. There is, however, epidemiological evidence that exogenous reinfection plays an important part. There are the studies of Opie and McPhedran,[6] numerous other investigations into adult home-contacts and people exposed to special risk, such as medical students and nurses, and the findings among mental defectives in Newark, N.Y., mentioned by Prof. Lyle Cummins in the *Journal* of February 14 (p. 238). There is similarly no doubt about the high incidence of marital tuberculosis when the criterion employed is not merely fully developed clinical disease with symptoms but all radiologically detected tuberculous lesions (Opie and McPhedran[7]; Paterson[8]). In connexion with all such investigations it should be borne in mind that an increasing proportion of people first become infected in adolescence or early adult life, and that bronchogenic tuberculosis may follow within a relatively short time, even within a year (Myers *et al.*[9]; Malmros and Hedvall[10]; Frimann-Dahl and Waaler[11]). It may therefore be argued that some of the epidemiological investigations quoted above do not give proof of exogenous *re*infection but only of exogenous infection, as the bronchogenic tuberculosis may have followed a recent primary infection. Even if it is assumed that this process did occur in all the people investigated, for the purpose of control of the disease the distinction would be of academic interest alone, because in either case exogenous infection will have produced bronchogenic tuberculosis within a year or two of infection. Thus contact is of high importance in the development of the common type of pulmonary tuberculosis, at all events in adolescents and young adults. Its role becomes more predominant: (1) in the period after a fall in tuberculosis mortality, when a lowered incidence of infection in the general population follows decreased opportunities for contact (according to Drolet[12] the ratio of deaths to new cases of tuberculosis has varied little during the past twenty years); and (2) during times of lowered resistance, when the effects of primary infection or reinfection are likely to be grave. While admitting, therefore, that at present we do not know the relative roles of endogenous exacerbation alone and of exogenous reinfection alone in the causation of bronchogenic tuberculosis, it is evident, as Dr. Scott has pointed out (February 14, p. 238), that a retrograde step would be taken if in the control of the rising incidence of tuberculosis in this war the factor of resistance were alone considered and that of contact neglected. Unless corroborated by accurate statistical analysis, vaguely expressed statements that contact is harmless impede the adequate control of the disease.

1 *British Medical Journal*, 1941, **2**, 586.
2 *Beitr. klin. Tuberk.*, 1932, **81**, 707.
3 *Amer. J. med. Sci.*, 1935, **189**, 253; and *Pulmonary Tuberculosis: Pathology, Diagnosis, Management and Prevention.* Oxford Univ. Press. 1939 (Kayne, Pagel and O'Shaughnessy), p. 128.
4 *Wien. med. Wochr.*, 1936, No. 3.
5 *Brit. J. Tuberc.*, 1936, **30**, 204.
6 *Amer. J. Hyg.*, 1935, **22**, 539.
7 *Arch. intern. Med.*, 1932 **50**, 945.
8 *Amer. J. Hyg.*, Sect. A, 1940, **32**, 67.
9 *Arch. intern. Med.*, 1937, **59**, 1.
10 *Studien über die Enstehung und Entwicklung der Lungentuberkulose.* J. A. Barth, Leipzig. 1938.
11 *Acta Radiol.*, 1936, Suppl. XXXIII.
12 *Amer. Rev. Tuberc.*, 1938, **37**, 125.

PROTEINS IN GRASS

A meeting of the Nutrition Panel of the Food Group of the Society of Chemical Industry was held at Burlington House on February 11, Dr. G. W. MONIER-WILLIAMS being in the chair. The main item on the agenda was consideration of a paper by Mr. N. W. Pirie on "The Direct Use of Leaf Protein in Human Nutrition," which had been published before the meeting in the Society's official journal, *Chemistry and Industry* (1942, **61**, 45). The subject of the meeting—"Green Leaves as a Source of Protein and Other Nutrients"—was, however, wider in scope than Mr. Pirie's paper, and an interested and obviously expert audience heard contributions from Prof. A. C. Chibnall on the amino-acid make-up of leaf proteins, from Dr. Vernon Booth, speaking on behalf of himself and Dr. T. Moore, on the vitamin content of green leaves, as well as some more technological contributions from Dr. R. O. Davies, who discussed the stability of carotene in stored dried grass, and Mr. H. S. Jefferies on the lipoid constituents of grass, particularly the phospholipids and the sterols. Discussion continued for well over an hour, contributions being made by Mr. A. L. Bacharach, Dr. A. Pollard, Dr. S. K. Kon, Mr. Clayson, and Prof. Chibnall, who was critical of certain of Mr. Pirie's proposals. Mr. Pirie replied with spirit, but it can hardly be said that any unanimous opinion was expressed by the meeting.

Certain general conclusions, however, may legitimately be drawn from the papers presented by workers who had

obviously not only an interest in the matter but great technical competence in its investigation. The amino-acid make-up of leaf protein, if cocksfoot grass may be taken, as seems very probable, to be typical of green leaves in general, is curiously similar to that of first-class animal protein. Indeed, the almost complete identity of grass protein and milk protein takes, as one speaker pointed out, a good deal of the glamour away from the cow's performance as a converter. It appears also that grass is an extremely rich source of provitamin A, and that proper attention to conditions of storage, of which more investigation is needed and would have been given but for the war, might enable it to be harvested and stored under conditions that should lead to little more than 10% loss before fresh supplies are gathered. As a source of ascorbic acid, grass would seem to be less valuable than other vegetables, including other leaves, but this is more due to the relative instability of vitamin C than to any shortage in grass. As a source of riboflavin, grass is not the equal of other vegetable and animal foods, and little, if anything, is known about its contents of such factors as nicotinic acid, pyridoxine, and pantothenic acid. It appears to be negligible as a source of vitamin D, and its importance as a source of minerals was not considered sufficient to justify any discussion on this aspect. Set against these advantages, the relatively large amount of indigestible fibre in grass makes all but the freshest cuttings unsuitable for direct human consumption. It is largely for this reason that Mr. Pirie had advocated the expression of freshly cut grass, coagulation of the protein from the pressed juice, and the use of this for feeding chickens and other livestock, the residue, which still contains, according to him, nearly 20% of protein, being available for consumption by cattle. The high protein coagulum after further purification offers, he suggests, possibilities as a human food, though the food technologists present did not seem inclined to discuss methods of making it as acceptable in fact to the human palate as it appears on paper to the human stomach. To Prof. Chibnall's comment that any significant contribution of leaf protein to human nutrition would involve such an increase in intensive grass production as to constitute a revolution in British agriculture, and that agriculture in general and British agriculture in particular were slow-moving, Mr. Pirie replied by calling attention to the relative rapidity with which the beet-sugar industry had been introduced in this country. Moreover, Mr. Pirie's proposals, as is clear to those who read his paper carefully, are by no means confined to the use of grass, but might be applied, after appropriate investigation, to many other types of green leaf.

The whole subject is one of considerable complexity and the greatest possible interest, involving as it does not only questions of human and animal nutrition, but also the whole range of agricultural and economic factors that go to determine what crops can be grown in this country to the greatest national advantage. The Nutrition Panel is to be congratulated on having instigated this open discussion, which was very much appreciated by all who attended it.

ARGYRIA

W. R. Hill[1] has been studying argyria for some years, and has analysed a series of sixty-eight cases seen at the Mayo Clinic between 1915 and 1939. In these the condition was generalized, and in no fewer than seventeen instances specimens of skin were removed and submitted to microscopical examination. Silver, it appears, may be absorbed into the system through almost any orifice. As would be expected, in the majority of cases it was introduced through the mouth either to be swallowed as medicine in the form of pills or capsules, or to be used in the form of drops, paint, or sprays in the treatment of the nose and throat. But about one-third of all the cases had submitted to silver irrigation or instillation elsewhere. As is well known, silver compounds have been much used for diseases of the genito-urinary tract in both sexes, and also for eye lotions. It seems, too, that colloidal preparations of silver are just as likely to produce argyria as any other silver compound, although silver nitrate, being the compound most often used, is, as might be expected, the commonest cause of the condition. Silver nitrate was the sole silver compound employed in twenty-two out of the sixty-eight cases. All observers are agreed that the metal is deposited exclusively in the cutis, never in the epidermis. Granules of silver can be detected in the papillary bodies (where it forms a subdermal line), on the membrana propria of the sweat glands, and on the connective-tissue membrane about the sebaceous glands and hair follicles. It also appears in the walls of blood vessels. Hill and Montgomery have made a special study of the appearances under dark-field illumination, and many of the sections, excellently reproduced, are very beautiful. They graphically show the metallic deposits. Perhaps the most interesting fact disclosed in this paper is that in these cases the silver is deposited not only where the typical discoloration is visible but also elsewhere; for microscopical diagnosis, therefore, a specimen can safely be taken from the non-pigmented skin. The dark-field method is much easier and more convenient than examination of the directly illuminated stained specimens. Workers experienced in the dark-field technique are also able, so it seems, to distinguish between the picture shown in argyria and that in cases of gold and bismuth pigmentation.

[1] *Arch. Derm. Syph.*, Chicago, 1941, **44**, 588.

RESEARCH IN INDUSTRIAL MEDICINE

The Medical Research Council announces that it has appointed Prof. A. W. M. Ellis, M.D., F.R.C.P., formerly professor of medicine at the London Hospital, to a whole-time position on its scientific staff as director of research in industrial medicine. The investigations to be undertaken by Prof. Arthur Ellis and his assistants will in the first instance be directed to problems of industrial toxicology which are of special importance during the war. This announcement will be welcomed, because it gives tangible recognition to the great and growing demand for closer contact between medicine and industry. In the words of a leading article published on November 29 last: "The factory doctor wants advice and help from the best brains in the profession, and he wants it now." Workers and managements alike are looking to our profession for guidance on positive preventive measures to maintain health in industry and thereby enhance production.

Special arrangements are being made to secure adequate follow-up treatment for persons (for whom the State has accepted responsibility) who have been under care at Special Centres in the Emergency Hospital Service for injuries to the peripheral nerves, head, chest, and jaw, for complicated tendon injuries, chronic osteomyelitis, bone-grafting, intracapsular fractures of the femoral neck, and severe joint and spinal injuries. A Ministry of Health circular (No. 2563) to hospitals having Special Centres and/or Fracture Departments "A" suggests the procedure to be followed to secure that these patients return for examination and treatment after a suitable interval, that there is continuity in treatment, and that case records are complete.

ROCKEFELLER MEDICAL STUDENTSHIPS, 1942

The Rockefeller Foundation has again offered 25 studentships to enable 25 men or women to take part of their clinical courses at medical schools in the United States and Canada. The offer is made primarily to help students in schools which have suffered in consequence of enemy action, but suitable applications from all medical schools in England, Wales, Scotland, and Northern Ireland will be welcomed. The studentships, which are tenable, subject to satisfactory progress, for two years (it may be possible to arrange for a shorter period in special cases), will cover all tuition fees, maintenance,* etc., but *not* the cost of travel to and from America. Students must return to this country in order to take their final examination.

The following medical schools in the United States and Canada are prepared to take one or two students: Universities of California, Chicago, Cincinnati, Columbia University, Cornell University, Duke University, Harvard University, Universities of Illinois and Iowa, Johns Hopkins University, McGill University, Universities of Michigan and Minnesota, New York University, Universities of Pennsylvania and Rochester, Stanford University, University of Toronto, Tulane University, Vanderbilt University, Washington University, Western Reserve University, University of Wisconsin, Yale University.

The successful candidates will probably leave this country early in August, and all applications must be received not later than *Saturday, April 25.* Application forms may be obtained from the Dean of the Medical Faculty or School, and *must be sent in only by the Dean.* Applications must be accompanied by a full and confidential report by the dean, a medical certificate, and an *x*-ray photograph of the chest. Examination of the eyes and ears is considered of the utmost importance. Candidates must be willing to comply with certain conditions as regards vaccination demanded by American universities.

Such candidates as the Committee of Award may wish to see will be interviewed in London. The date and place will be communicated in due course.

* Note.—The maintenance grant, which will be received from the American Dean in instalments, should be sufficient for clothing, books, student supplies, and all other expenses except that of serious illness. A fund has been set aside to cover expenses of illness requiring hospital care, after application to the Dean. Dental care will usually be considered a personal expense. In case of death the student's family will be responsible for burial expenses. Students are not advised to take their own microscopes or other instruments or books.

AWARD TO WOMAN SHIP SURGEON

The award of the M.B.E. (Civil Division) to Dr. ADALINE NANCY MILLER, ship surgeon, s.s. *Britannia,* is announced in the second *Supplement* to the *London Gazette* dated February 17. The announcement reads as follows: "The ship was sailing alone when she was approached by a raider, which opened fire at long range. She replied with her defensive armament, but a shell put her main gun out of action and she suffered heavy structural damage. As her speed was less than that of the enemy, the captain gave orders to abandon ship. A signal to this effect was made to the enemy, but the raider continued shelling, and holed many of the lifeboats. He sank the ship by gunfire and made off. During the action the ship's doctor, with perfect calm, attended to the wounded and dying. She continued her good work after the company had taken to the lifeboats, and, by her efforts, saved many lives. . . ."

C. A. Videla (*Rev. Med. Cienc. Afin.,* Buenos Aires, 1941, **3**, 96) adds observations on twenty-six new cases treated by local specific serotherapy to a previous communication based on thirty-three cases. Treatment was carried out with anti-anthrax serum prepared in the Bacteriological Institute of the Argentine National Health Department. The dosage used was 40 c.cm as a peripustular and 60 c.cm. as a peri-oedematous injection. In cases with extensive oedema the latter dosage was raised to 110 c.cm. These doses were repeated after twenty-four and forty-eight hours. In most cases, it is claimed, the treatment is highly successful and a cure is obtained in one or two days. With early cases septicaemic complications are prevented and the disease is aborted in its initial stages.

Reports of Societies

WARTIME PROBLEMS IN PARASITOLOGY

The Association of Applied Biologists held a symposium at the London School of Hygiene and Tropical Medicine on February 20 on the ecology and control of lice, itch-mites, and other parasites.

Head and Body Lice

Mr. J. R. BUSVINE of the Entomological Department of the School gave an account of some applied research which has been proceeding there on methods of controlling head and body lice. He said that *Pediculus humanis* needed a constant environmental temperature of about 30° C. The eggs took nine days to develop and the louse a further nine days to reach adult stage. Compared with ticks, fleas, and bugs, it starved to death very quickly. So long as there was efficient laundering in a civilized community there was not likely to be trouble from lice, except in the case of people in casual wards or air-raid shelters. But in the event of a breakdown, such as would follow an invasion or widespread bombing, or crowding of refugees, a very different state of affairs would obtain. The powder known as A.L. 63, which was a great advance on powder of the old type, gave protection only for a few days. A more lasting insecticide which could be applied to clothing was needed, and this had now been found in a liquid preparation the composition of which was for the present a secret. Its effect lasted a long time and was not destroyed by perspiration. It had been tried out on the clothing of infested tramps, and they were found still protected a month after treatment. The disadvantage was that the substance was dispersed when the clothing was washed, but a device—again at present a secret one—had been invented by which most of the lice population on a person could be concentrated on a small piece of material which was impregnated with the louse poison. For head lice the insecticide has been prepared in the form of a medicated "brilliantine." It was understood that particulars of the new preparation could be obtained from the Ministry of Health.

Transmission of Scabies

Dr. K. MELLANBY described certain experimental work on the transmission and development of scabies. He said that statements were frequently published that war conditions, especially shelter life, were responsible for an increased incidence of scabies. Probably there was a great deal more scabies in the country than at any time since immediately after the last war, but there was no foundation for the belief that war was the cause of the larger incidence. The reports of the Chief Medical Officer of the Board of Education in 1937 and 1938 referred to an increase of scabies at a time when there was no war and when housing and employment were improving. The present epidemic of scabies was the continuation of a trend which was in existence before the war started. Under badly controlled conditions, no doubt, scabies, like other parasitic diseases, was more readily transmitted among susceptible populations. Nevertheless, in towns where there had been no bombing and no shelter experience scabies had increased in the same way as elsewhere. The coincidence of epidemics of scabies with the periods of the last and the present war was fortuitous, or at least the connexion was not a simple one. Nor was it always the dirty individuals who suffered it; it was perfectly easy for people of scrupulous cleanliness to contract scabies, but as scabies was most frequently diagnosed by its secondary infections, which were less likely to occur among clean people, the real condition was often missed.

It was the common view that scabies was contracted normally by occupying beds which had been occupied just previously by infested persons. He had obtained the services of a group of pacifist volunteers who had been willing to run the risk of infection. In certain experiments, directly a sufferer from

scabies had got out of bed, and while the blankets were still warm from his person, the volunteer, naked, had got into the bed, but in none of the twenty-five cases in which this experiment was tried was the scabies transmitted. The volunteers had also put on the underclothing of scabies patients, but in two instances only was the infection transmitted in that way. But on putting two volunteers—one of whom had been infected with scabies and the other had not—into the same bed together, both wearing sleeping pyjamas, the infection was readily transmitted. Thus personal contact of an intimate—or even not particularly intimate—nature seemed to be the most likely method of spread, and contact with inanimate objects which had been next to a scabious person was not as dangerous as had been thought. Any risk, therefore, in occupying strange beds was not high. He added that the itching associated with scabies was not due to the continued activity of the mite, but might continue for weeks after the parasite had disappeared. A man with sores was quite likely to be relatively non-infective.

Major C. G. JOHNSON discussed some quantitative aspects of scabies parasitology as observed at a military clinic. The egg stage of *Acarus scabiei* lasted about three days, the larval and nymph stages each about the same time, and then the female adult might go on burrowing in the skin for two or three months, laying eggs at the rate of two or three a day. On taking a hundred infested adult persons, by far the largest group were found to harbour only from one to three ovigerous females. Occasionally very large numbers would be found on one person, up to 200 or more, but these cases were very rare. Sometimes the female parasite population in an individual went up, but it also went down, and sometimes became extinct of its own accord. The site of selection of ovigerous females was most frequently in the hands and wrists, and next most frequently in the penis and scrotum.

Control of Flies

Another wartime entomological problem was mentioned by Mr. H. G. H. KEARNS. After the bombing of cities, he said, it was not uncommon for food stores of all kinds to be damaged and, mixed up with building debris, to be exposed to the weather for a long time. This attracted immense populations of flies. In one town the invasion was so great that the fish market had to be closed early in the day and no food could be exposed in the shops. The obvious method of control was to remove the debris, but meanwhile the most economical and successful method of dealing with the flies was by a liberal spraying of emulsified tar oil on the exposed surfaces. This acted mainly as a repellent to the egg-laying females, and generally two applications were necessary before any abatement of the nuisance was noticeable. Inside the bombed buildings a portable compressor mounted on a trailer chassis and ejecting a suitable quantity of atomized insecticide might be used.

G. Rossie (*Rif. med.*, 1940, **36**, 1252) strongly praises the treatment of malaria with adrenaline only, following the original method of Ascoli. He gave continued treatment to 100 of 310 cases with enlarged spleen in Northern Albania, and was convinced of the superiority of the adrenaline over quinine and synthetic remedies. In his view this treatment "removes the danger from malaria," especially in the endemic chronic types. Ballero (*Riv. malariol.*, 1940, **19**, 587, 595) in two papers discusses the prophylactic and therapeutic value of this treatment. Altogether 140 patients were treated. After adrenaline the parasites could be found in only one case. Except for 11 cases the splenic enlargement was reduced. A follow-up of the cases treated in 1938 was made in the same year and in 1939. Parasites were found in 7 cases, but generally the spleen had still further regressed. Adrenaline in doses of 1/10 or 1/20 mg. was well borne and distinct improvement occurred in all cases, as was shown by increased weight. The follow-up observations showed that there were 3 to 4% relapses in adrenaline-treated cases and 50 to 90% in the controls. Moreover, 97% of the treated cases showed a remarkable improvement in their general condition.

Correspondence

Surgical Instruments for Russia

SIR,—I shall be grateful if you will give me a little space to thank my colleagues who sent instruments and appliances in response to my appeal (December 6, p. 830) for such gifts for the use of surgeons with the Russian Armies. The response has been very generous; some 200 parcels were received, and the value of the gifts amounted to at least £3,000. Whenever the names of the donors have been available individual acknowledgment has been made, and Madame Maisky has herself insisted on sending a personal note.

I may mention that the need continues, and if any of my colleagues still have surplus instruments they would be most gratefully accepted.—I am, etc.,

ALFRED WEBB-JOHNSON,
President, Anglo-Soviet Medical Committee.

London, W.1.

Vitamin C Requirements

SIR,—May I point out an omission in your interesting leading article on vitamin C requirements of man. The fact that wounds fail to heal properly when the patient is in the subscurvy state is not, I think, sufficiently stressed. The observations of Crandon on himself[1 2] are mentioned and an account is given of the failure of his wound to heal until ascorbic acid was given. But no mention was made of the work of Wolbach and his co-workers,[3 4] of Lanman and Ingalls,[5] and of Taffels and Harvey.[6] They showed what was lacking in the healing wounds of guinea-pigs, and their work has been confirmed by Hunt,[7] working both on guinea-pigs and man. It seems that unless an adequate amount of ascorbic acid is present precollagen is not converted into collagen and the healing wound does not develop sufficient tensile strength to resist the ordinary stresses and strains which follow an operation. The pioneer work of L. J. Harris and his co-workers[8] on the unsaturation of many hospital patients, and especially those suffering from gastric and duodenal ulcers, has been abundantly confirmed by many workers. It has led some physicians and surgeons to give at least 2,000 to 3,000 mg. of ascorbic acid to all patients before a gastric or colonic operation so as to ensure that the wound in the viscera will not leak and so cause peritonitis; and to patients before abdominal operations to make certain that the wound does not burst open or cause weak scars leading to incisional herniae.

This practice is more especially necessary in wartime, and it might be wiser to give some extra ascorbic acid to all patients before operation.—I am, etc.,

GEORGE GRAHAM.

London, W.1.

*** The part played by vitamin C in the healing of wounds was referred to in a leading article in the *Journal* of April 12, 1941 (p. 560), entitled "Problems in Wound Healing."

SIR,—Your leader on vitamin C requirements in man in the issue of February 14 refers to a paper by Difs in which he reported "no correlation between the ascorbic acid content of the blood and the number of petechiae noted in the capillary-resistance test." The rest of the leader summarized very clearly evidence showing with a high degree of probability that the level of plasma ascorbic acid does, in fact, indicate whether or not a subject is receiving sufficient vitamin C. It is therefore pertinent to point out that Difs's observation is merely a further indication that the capillary-resistance test does not throw light on the state of vitamin C nutrition. This is in complete accordance with the clinical observations reported by Scarborough over the last few years, and with recent work in this laboratory, where we have been able to demonstrate a lowering of capillary resistance in guinea-pigs receiving 5 mg. of ascorbic acid daily. This effect is prevented or reversed by

1 *New Engl. J. Med.*, 1940, **223**, 353.
2 *J. Amer. med. Ass.*, 1941, **116**, 663.
3 *Amer. J. Path.*, 1933 Sup., **9**, 689.
4 Ibid., 1934, **10**, 569.
5 *Ann. Surg.*, 1937, **105**, 616.
6 *Proc. Soc. exp. Biol.*, 1938, **38**, 518.
7 *Brit. J. Surg.*, 1941, **27**, 436.
8 *Lancet*, 1936, **1**, 1448.

administration of hesperidin and certain other substances showing "vitamin P activity." Our findings were reported to a recent meeting of the Biochemical Society (*Chem. Ind.*, 1942, **61**, 96), and it is hoped to publish them in greater detail in the fairly near future.—I am, etc.,

Biochemical Department, Glaxo Laboratories, Ltd. A. L. BACHARACH, M.A., F.I.C.

How Much Vitamin D?

SIR,—I read with interest your leading article (January 10, p. 47) in which attention was drawn to the discrepancy between the daily dosage of vitamin D recommended by the Ministry of Food in their cod-liver oil compound and the unit dosage given in the 1936 *Addendum* to the *B.P.* The question of vitamin D dosage is a vexed one; it is complicated by the fact that the optimum daily requirement is higher than that needed to prevent active rickets, and that the requirements vary from child to child. Since L. J. Harris (1933) suggested 1,500 units of vitamin D as a suitable prophylactic dose, other workers have recommended lower amounts. Some American observers have thought that 400 units daily is sufficient: Mackay (1942) says that 300 units daily may be enough if the baby is kept under observation and the dose doubled at once if early signs of rickets are noted. L. J. Harris (1939) in his article on vitamins in the *British Encyclopaedia of Medical Practice* says that the dose lies between 500 and 1,500 units daily. Park (1940) thinks that 800 to 1,000 units daily is a safe dose. In my own work I aim at giving 800 to 1,000 units daily in order to prevent rickets and promote optimum growth.

I think it came as a surprise to many paediatricians when it was discovered that the amount allowed in the free cod-liver oil compound was only about 180 units daily up to the age of 6 months and about 360 units daily after 6 months. Moreover, it is possible for a mother to get the free issue of oil on showing her child's ration book, without any medical supervision. Thus, many infants who were already having adequate amounts of vitamin D daily have had their unit dosage drastically cut down. If the mother attends the clinic regularly this can be remedied; in these days of war work, however, regular attendance is not always possible. I should like to see the unit dosage raised to at least double its present level.—I am, etc.,

Finchley. CECILE ASHER, M.D., M.R.C.P.

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Stretcher for Mountain Casualties

SIR,—Mr. D. G. Duff and those who have read his timely contribution on stretchers for mountain casualties (February 21, p. 261) will be relieved to know that the Army authorities have not been so inactive as his note would apparently suggest. A considerable time ago I was consulted by the medical department of the War Office on this very point. As I have studied it for many years I was able to give them the results not only of my own experience but of that of several Continental armies, including the German army.

I was later asked by a department of the War Office especially concerned with the problem to pursue the question further. As a member of the Committee of the Alpine Club at the time of the formation of the Joint First-aid Committee of the British Mountain Clubs, I was naturally aware of its existence. Indeed, I received most valuable advice from its chairman, Mr. Wilson Hey, as well as from many other mountaineers whom I consulted. After these consultations a number of experiments were made by myself and a picked group of officers of the R.A.M.C. Many types of stretcher were examined and recommendations made. These recommendations were accepted with but little alteration.

The matter, of course, does not rest there. I am still in touch with the appropriate authorities and will always be glad to receive suggestions and to pass on any which appear new and likely to be useful. I am not at present at liberty to publish the recommendations which I have made, but I write this letter in the hope that medical mountaineers may be reassured.—I am, etc.,

Aylesbury, Bucks. RAYMOND GREENE.

Treatment of Fresh Compound Fractures and Wounds

SIR,—Mr. J. C. Scott's article (February 14, p. 209) seemed to me to place undue reliance on the excision of wounds in compound fractures, and failed to emphasize the value of adequate drainage. The careful and early radical removal of all visible dead and dirty tissue in the wound is of vital importance, but we must realize our limitations and admit that few of the more severe compound wounds can be excised completely. This particularly applies where important structures are exposed in the depths of the wound and in perforating wounds by missiles.

The word "drainage" appears only incidentally in Mr. Scott's article, yet drainage is the greatest single factor preventing the onset of gas gangrene and, apart from amputation, is the treatment of the infection when it occurs. Filling the cavity of the wound with gauze does not always provide efficient drainage. Drainage, to be efficient, must take place at the most dependent portion of the wound, and a separate incision is often necessary. All parts of the wound should be adequately drained; large wounds may need more than one drain. Two apertures for drainage are always better than one, so as to prevent a vacuum forming and the retention of discharge by atmospheric pressure. Narrow, tapered, corrugated rubber is a good material for drainage and may safely be left in position for as long as two weeks. The presence of a drain will not cause a clean wound to become septic provided the skin around the wound is clean and the dressings are not disturbed.

Wounds might be classified along the following lines, with suitable alternative methods of treatment:

1. Those which can be completely excised.	(*a*) If skin unites, suture completely. No need to drain.
	(*b*) If skin will not unite without tension. Partially suture, lightly pack, and provide dependent drainage if necessary.
2. Those which cannot be completely excised.	(*c*) Suture completely if vital for function, do not drain, watch carefully, drain at first sign of infection—e.g., compound fracture of the patella.
	(*d*) Suture partially or completely if it is desirable to cover important structures with skin. Dependent drainage if necessary.
	(*e*) Leave completely open. Pack lightly and provide dependent drainage if necessary.

Nothing is more satisfying than complete suture of a compound fracture wound followed by first-intention healing, but when in doubt there is no ignominy in providing drainage. The presence of a drain will not infect a perfectly excised wound, but it will prevent an infection where a wound cannot be perfectly excised. A little pus—not under tension—does little harm, but pent-up infection, be it ever so mild, will lead to bony sequestration and delay in the union of the fracture.—I am, etc.,

Sunderland. DAVID BROWN, M.Ch.(Orth.), F.R.C.S.Ed.

Carotid Cavernous Aneurysm with Fistula

SIR,—An account of this rare condition and its successful treatment is always of interest, yet the description by Dr. W. J. Roche (February 7, p. 182) affords additional room for consideration in the remarkable explanation put forward to account for the accompanying loss of vision and eye movement. The former is attributed to bending of the optic nerve by the forward displacement of the internal carotid artery occasioned by enlargement of the cavernous sinus, and the latter, the ophthalmoplegia, to pressure or kinking of the oculomotor nerves in their passage through the sinus. Concerning pressure on the optic nerve, it may be remembered that the internal carotid artery runs in a groove on the body of the sphenoid bone which terminates as the artery turns upwards to leave the cavernous sinus between the anterior and middle clinoid processes. It is doubtful whether distension of this venous space would cause any significant displacement of the artery, and, if it could, whether it would be sufficient to give rise to serious pressure on the optic nerve, which lies somewhat protected in a groove. But, granting that it did, would not the amblyopia so produced be of the pressure atrophy variety, possibly chiasmal in distribution as regards the opposite side and associated, therefore, with certain phenomena which are not recorded in the text? Regarding these difficulties, is not the suggested explanation rather laboured in view of the fact that a stagnant anoxaemia

of the retina will cause loss of vision as certainly as does the anaemic variety?

Concerning the origin of the lid and eye palsies, it may be recalled that the third and fourth nerves run in the outer portion of the cavernous sinus and are not in close proximity to the artery, so that they are not likely to be affected by a general distension of this space; yet, if this mechanism were operative in producing the palsies, would not some involvement of the first two sensory roots of the fifth nerve almost certainly be present—an association which, we are told, was not found? Is it not probable that a more reasonable explanation of the ophthalmoplegias lies in the progressive oedema of the orbital tissues which is admitted to be responsible for the proptosis? Retrobulbar swelling limited to the extraocular cone of muscles leads to exophthalmos, often with upper-lid retraction, a restriction of eye movement, mechanical in origin and partial in extent, being most marked in the case of the upper rectus and less so in regard to the lateral rotators. Following a general rise in the intraorbital tension, the above features become more pronounced, but the picture is altered by the fact that increasing pressure is exerted on the rear of the orbital septum, causing it to bulge forwards against the lids, thereby compressing the palpebral venous arcade which lies in the region of the fornices and whose function is to drain the conjunctiva and the lids. Thus are produced chemosis and oedema of the lids, with the result, so far as the upper lid is concerned, of an appearance of ptosis due to swelling and "ironing-out" of that structure. As soon as the intraorbital tension is relieved the ptosis and eye palsies recover within a few days, an event hardly to be expected in such short measure if due in origin to nerve damage by pressure.

As a point of academic surgical interest in connexion with the operation, may one inquire why the external carotid artery was tied in addition to the internal carotid artery? The necessity for this adjunct is admitted in regard to ligation of the common carotid artery for affections of the internal carotid artery, but it is surely redundant when the latter is tied, as no collateral circulation exists between the two systems apart from that afforded by terminal twigs of the ophthalmic artery, a communication which is not blocked by the measure owing to the free anastomosis between the two external carotid systems.—I am, etc.,

London, S.W.3. J. H. MULVANY.

Preserving the Race in Post-war Reconstruction

SIR,—The admirable letters on this subject that have appeared in the *Journal* are very opportune. It is time the medical profession did some realistic thinking on this subject. In the hope of eliciting some constructive suggestions I put the following questions to your readers:

1. Is the national entity we refer to as the British race worth perpetuating?

2. Is quantity or quality more desirable?

3. Can any good purpose be served by promoting a higher birth rate without eugenic safeguards?

4. Can the withholding of contraceptive knowledge, as referred to by Mr. Green-Armytage (February 21, p. 272), result in more wanted babies or only in more unwanted babies?

5. Are we to cope with the normal illegitimacy rate by legalizing abortion, or is the illegitimate child on the average an asset to society?

6. Are psychologists and school teachers talking nonsense when they say that the only child is definitely handicapped in character development?

7. Is it generally desirable to treat and, if possible, cure the functionally sterile male (i.e., the bachelors, the homosexuals, and cases of functional impotence)? Or should we regard their growing numbers with complacence?

8. It is generally agreed that, granted adequate economic resources, the large family, suitably spaced, gives to the individual members the best chance of sound character development. If this is the case and if we assume that Dr. Evelyn Fisher's hostels are full of helpful young women in slacks and jumpers, what more can be done to promote economic and domestic stability without eliminating the essential vitamin of family life—parental responsibility?

9. Is it possible, peradventure, that we as a profession have to answer to some extent for the present state of affairs in any of the three following ways? (*a*) By our solemn, if exaggerated, warnings to the husband about a second pregnancy after our brilliant and heroic conduct of his wife's first labour; (*b*) by the unnecessary withholding of anaesthetics during labour; (*c*) by the example of unduly limited families.

Trusting that you, Sir, will not quench the smoking flax of medical sociology, but rather open your columns to the discussion of this subject,—I am, etc.,

London, W.1. H. CRICHTON-MILLER.

SIR,—Will you kindly allow me to thank those who have commented in the *Journal*, and privately, on my letter (February 7, p. 196)?

A criticism of my figures included the item that in some years, such as war years, the trend of our race reduction is apparently not continuous. This does not affect their general accuracy and application. I strongly recommend those interested to study the introduction of the Registrar-General to his "Preliminary Report on the Census of England and Wales, 1931." The figures there and the striking graphs are only more convincing and forcible than mine.

The causes of the gradual trend to race extinction in white civilizations are complicated, and remedies, except in some directions mentioned in my letter, are difficult to apply, especially at this time of such tremendous national issues. A committee of inquiry might usefully be set up by such an authority as the Ministry of Health to consider the facts, causes, and remedies, if the right persons can spare the time from their other duties to serve on it. I was grateful to receive from Sir Francis Fremantle a letter showing that he was very interested and active on the subject.

I know from long experience as a medical officer of health that among the chief factors of the decline in the birth rate the expense and hard work that children entail are major considerations. Without delay the Ministry of Health and local authorities could consider housing accommodation and education expenses and the need for extension of such services as "home help" for all actual and potential mothers. I am afraid that Dr. A. J. Brock's "devitalization" theory (February 21, p. 272) is another name for luxury-loving and its consequences. We are at present learning that one can live healthily much more simply than we have been doing in recent years. It must be recognized that with the extension of education, ambition, and power the countries of the world will eventually be occupied by those nations whose women are content to bear children, however interesting and valuable their other work may be.—I am, etc.,

Eastbourne. W. G. WILLOUGHBY.

Origin of Tuberculosis in Adults

SIR,—Dr. V. S. Hodson in his letter (January 17, p. 89) asserts that "it is generally accepted that in this country *all* adults acquire tuberculosis infection during the years of infancy or adolescence, though, happily for the most part, without recognized symptoms or illness." (The italics are mine.) I venture to question whether so sweeping a statement "is generally accepted." Dr. Hodson then says: "This being so, it seems that the repetition of the unfounded statement that adult cases of tuberculosis result from reinfection is an anachronism." Having started with one assumption, he proceeds to another based on the first. Dr. Hodson would be hard put to it to prove that *all* adults have been infected in infancy or adolescence. If some escape then there is no reason why such adults should not become infected. That a large proportion of the population is infected with tuberculosis in early life seems to be well established, but it is an infection which, as Dr. Hodson admits, is for the most part aborted. Dr. Hodson apparently belongs to a school which holds that such abortive infection protects against further reinfection with tuberculosis, and that all cases of tuberculosis occurring in adults are explained by the activation of tubercle bacilli which have been dormant since the initial infection in early life.

He begins his letter by saying: "It appears that the idea is widely held that adult pulmonary tuberculosis in this country is due to reinfection" (the word "reinfection" is always recurring,

on the assumption that everyone has already been infected) "from adult to adult" (why "from adult" necessarily?), and adds, "I know of no evidence to support this theory." But is the evidence any stronger for the theory that adult pulmonary tuberculosis is always the result of the activation of tubercle bacilli which have been lying dormant since childhood? Dr. Hodson makes the curious admission that "adults in some parts of the world may become infected" (note not "reinfected"). But is there any reason to believe that Oslo nurses or South African miners—the examples he gives—are not just as liable to infection in early life as people in this country?

Dr. Hodson then brings forward the case of a woman who broke down eight years after her husband died of pulmonary tuberculosis, and asks triumphantly: "What, then, is the incubation period and how do the upholders of the idea of adult reinfection" (note again "reinfection") "distinguish which of the known and unknown contacts has passed on the microbe vicious enough to cause the breakdown in an individual already infected?" Surely there is confused thinking or confused writing here! In reply one might quote some words of Huxley in another controversy on beliefs: "Why should anyone be asked to say how he knows that which he does not know?" We do not profess to any certain knowledge of the modes of transmission of the tubercle bacilli or of the incubation period. We do, however, know that the bacillus is ubiquitous and that therefore infection may presumably be possible at any time without being *directly* traceable to a particular contact.

But what answer can Dr. Hodson himself give us? Is it so much easier to believe that the tubercle can lie dormant and after a period of several years suddenly wake to life at the stimulus of "excessive stresses and strains," as he would have us believe? The question of the incubation period, as distinguished from the period of dormancy, would still remain to be answered. As regards the case of the woman quoted, we should like to know how far she was kept under strict observation after (and even before) the death of her husband. Unless kept under strict observation over the whole period she might well have shown signs of tuberculosis long before she came to be diagnosed; which would be very germane to the question at issue.

Dr. Hodson declares: "Apart from patients with a family history I cannot remember a single one that knew of a contact with a case of pulmonary tuberculosis." It is naturally the family, or rather the household, which presents the most cases of obvious "contact," and until the theory in which Dr. Hodson is a believer is proved he is not entitled to exclude all such cases as having no bearing on the question of transmission of tuberculosis to an adult from close association with a case of pulmonary tuberculosis. Incidentally, has Dr. Hodson ever asked himself in what proportion of cases of infectious diseases—for example, diphtheria or scarlet fever—it is found possible to trace the case to any known contact?

In conclusion, I agree with Dr. Wallace (January 31, p. 163) that the onus of proof lies with Dr. Hodson, and that "until concrete proof that adult to adult" (though why necessarily from adult I fail to see) "reinfection is impossible, our present management of tuberculosis should not be relaxed." I am so cut off from the world at the moment of writing that I fear my letter will be very late in appearing. But I much hope that this question will not be allowed to drop without the views of other tuberculosis workers being heard.—I am, etc.,

E. WEATHERHEAD.

Increase of Tuberculosis

SIR,—May I draw attention to the unreasonable nature of Dr. V. S. Hodson's views in his letters of January 17 (p. 89) and February 14 (p. 239). If a decrease in an individual's "resistance" can be responsible for awakening to activity a previously dormant endogenous focus of tuberculous infection, then it is surely unreasonable to suppose that such a decrease in resistance cannot also render an individual susceptible to exogenous infection, whether he already has or has not a dormant tuberculous focus.

As everyone cannot enjoy the felicity of uninterrupted perfect health, I deem it wiser to continue to regard cases of "open" tuberculosis as grave public dangers. Speaking for myself, I would not willingly undergo the risk of *heavy* contamination with tubercle bacilli, even in my moments (fortunately frequent) of perfect health and unimpaired resistance; nor, I think, would any other medical man, including, I believe, Dr. Hodson, despite the statement at the end of his letter of February 14.—I am, etc.,

Stafford. J. G. H. FREW.

Amoebic Liver Abscess

SIR,—Some years ago there was admitted to East Fortune Sanatorium a young discharged time-serving soldier whose illness presented points of interest which are in many respects similar to those of the patient described by Lieut.-Colonel J. D. Sandes (February 7, p. 184). Unfortunately the history in our record notes is not detailed in the matter of dates, but this history at least is accurate.

He was a Regular soldier from 1926 to 1934, and during that period he served for five and a half years in India. It is in respect of these five and a half years that we have no accurate dates. He was discharged some time during 1934 and was perfectly well until January, 1936, when he began to have attacks of nausea and vomiting. During February pain appeared in the lower part of his right axilla, and at the beginning of May he was admitted to a local sanatorium with a diagnosis of pleurisy. The diagnosis was not questioned until the end of the first week in June, when the abdomen began to swell. He was then transferred to us for diagnosis and treatment. He was in a very bad way—emaciated, extremely weak, had a hectic flush, was febrile (99° to 101.5° F.), and had a rapid pulse. His liver was huge, and the skin over the bulging abdominal portion was pale, glossy, and oedematous. The organ was not tender and the spleen was not palpable. The diagnosis of liver abscess was fairly obvious, and the abscess was easily located by puncture through the anterior abdominal wall. The fluid withdrawn was bloodstained and slightly greenish, but on the following day I inserted a needle into an area of dense basal dullness and drew off typical tropical abscess pus. Our treatment will not meet with Colonel Sandes's approval. The abscess was drained transpleurally after resection of 2½ in. of the tenth right rib posteriorly, and the best part of a gallon of pus escaped at the operation. Several pints escaped during the following day, and on the day after that again the drainage tube drained nothing but pure bile. He was given intensive treatment which included emetine by injection, stovarsol by mouth, and yatren enemata, and his recovery was rapid and continuous. He was discharged from the sanatorium six months after the operation, a big, sturdy healthy man. Cultures of the pus were sterile and smears showed necrotic debris. No pus cells were seen and amoebae were not found.

During his five and a half years in India this man had several attacks of diarrhoea, but he was never in hospital and none of the attacks was severe. Unfortunately the time interval between his return from India and the onset of his illness in January, 1936, is not known to me, but there was presumably an interval of at least two years of good health.—I am, etc.,

East Fortune Sanatorium, Scotland. C. CAMERON.

"Ether Convulsions"

SIR,—It may seem unexpected that a psychiatrist should ask for permission to speak in the discussion on this subject; but since Meduna introduced convulsions as treatment of certain mental disorders eight years ago the induction of epileptiform seizures and kindred conditions of cortical irritation has become a household activity of every psychiatric hospital and clinic. On both theory and practice of this therapy a vast literature exists, from which there is ample proof that the clinical effects as well as the beneficial results are produced by cerebral anoxia. Convulsant drugs and electric current are the usual methods, but some authors have applied inhalation of pure nitrous oxide or of nitrogen with more or less identical results (Himwich, H. E., *et al., Proc. Soc. exp. Biol. Med.*, 1938, **39**, 367; Fraser, R., and Reitmann, F., *J. Neurol. Psychiat.*, 1939, **2**, 125; Fogel, E. I., and Gray, L. P., *Amer. J. Psychiat.*, 1940, **97**, 677). Thus the incident which the anaesthetist and the surgeon dread and try to avoid is what the psychiatrist seeks and provokes. The subject of interest is the same, and my plea is for pooling observations between two branches of medicine. The study of the so-called ether convulsion cannot

but profit from the experiences of psychiatrists who have used a great variety of means to produce convulsions, including hypoglycaemia; they have the opportunity to observe the premonitory movements and the whole sequel of signs in artificial epilepsy at their ease.

The following observations are of interest in respect of the theories of ether convulsions. Atropine is regularly given in psychiatric cases to combat vomiting after convulsant drugs; only single twitchings, but never a full seizure, can be evoked by external—"neurogenic"—stimulation if the amount of the drug or of the electric current administered is below the convulsant threshold. The difference between the psychiatric patient in good physical health and a patient with high temperature on the operation table is obvious, but does not seem so great that a combined effort should not yield instructive results.—I am, etc.,

Crichton Royal, Dumfries. W. MAYER-GROSS.

Spinal Anaesthesia

SIR,—Having used percaine on a series of cases running into several thousands, I beg to plead for a flexibility of technique which should be associated with anaesthesia no less than with surgery: no single method is ideal for every case.

I have found the Etherington-Wilson technique to be the most accurate and rapid method for obtaining a high block, failure to achieve which is invariably due to neglect of details or faulty technique; but as this method is reasonably simple I cannot regard failure from that cause as being a contraindication. There is also one advantage which has not been stressed: there is no need to test for anaesthesia providing paraesthesias, notably "pins and needles" in the feet, are present.

The use of N_2O and O_2 in a closed circuit assists in controlling respiration and in the avoidance of vomiting, which is either anoxic or reflex; the lightness of the anaesthesia required permits the employment of adequate oxygen and precludes the necessity for recourse to an agent of 100% potency such as cyclopropane, which, being both scarce and costly, should be kept for use by itself. Pentothal, owing to its depressant effect on respiration, should not be used save in the small amount sometimes desirable before spinal puncture in an apprehensive patient. In spite of the aspersions cast on it, a wheal at the site of the puncture will be found to decrease discomfort to a marked degree. I can thoroughly endorse all observations concerning the value of phedracin (Ciba 2020), which is best used intravenously.

For low blocks the same precision is not obtainable by means of the Etherington-Wilson technique as by the Howard Jones method with the hypobaric solution, or the various methods which employ the hyperbaric ("heavy") solution. Where the latter is seen to its greatest advantage is in the anaesthesia of the "saddle area" obtained by the "Sitting Bull" technique (Maxson) with 1 c.cm. of the "heavy" percaine, representing one of the least traumatic anaesthetic procedures possible. However, for surgeons who prefer to do anal operations on patients in the prone position an equally satisfactory result is obtainable with the "light" solution, which can be injected when the patient is in position, no further movement of the patient or even of the towels being necessary. It can thus be seen that both solutions have their own particular advantages; but both are highly susceptible to alkali contamination, the result of which is more readily visible in the case of the heavy solution, precipitation being immediate and obvious.

To reserve spinal anaesthesia for the robust seems as ill judged as to inflict it on the moribund, there being a great number of intermediate cases in which only the most pusillanimous would deny their patient the advantages of a spinal anaesthetic owing to an element of risk. It is our function to assess which are legitimate risks and which are not, and it will be found that the mortality bears an inverse ratio to the experience of the anaesthetist.

There are two main contraindications to spinal anaesthesia. These are cardiovascular degeneration, and general decrepitude from any cause; but before deciding against spinal anaesthesia the increased facility, which means speed in operating in a quiet abdomen, and the remote mortality associated with the volatile anaesthetic agents should be considered; a death after a general anaesthetic is as suggestive of an error in judgment as is a death on the table under a spinal anaesthetic. Finally, I would plead for an eclectic attitude in technique and for the retention of both "light" and "heavy" percaine in the anaesthetist's armamentarium.—I am, etc.,

H. W. LOFTUS DALE,
Hon. Anaesthetist, Royal Bucks Hospital; Anaesthetist, E.M.S.

Aylesbury.

Heavy Percaine in Spinal Anaesthesia

SIR,—I should like to say how much I have appreciated Dr. Mushin's recent article. His views are practically identical with those I have formed on a series of 150 cases. Hypobaric techniques have been predominantly popular wherever I have worked, but realizing the greater comfort to the patient and the greater ease of administration of hyperbaric percaine I have used it now for the past eighteen months.

Many anaesthetists omit to turn the patient into the prone position when using "light" percaine because they realize it is uncomfortable for the patient, especially those who are in pain from perforated gastric ulcer or who have such conditions as colostomy or marked abdominal distension. It is also a cumbersome procedure. As laid down by Howard Jones, however, it must be done to ensure adequate sensory loss in upper abdominal operations, though it may be disregarded in operations below the umbilicus. It is, however, in just those painful upper abdominal operations that it is so necessary. In order to avoid this, I have on occasion seen the patient tilted in extreme head-down tilt with nurses and orderlies hanging on to the patient's shoulders. Or else they may be subjected to a similar extreme tilt in the reverse Trendelenburg, again with willing hands holding the patient from slipping on to the floor. Again, I have seen the bridge of the table raised in the small of the back, which certainly increases the discomfort of the patient. Again, patients much prefer to have their heads slightly raised on a pillow during an operation performed under a spinal anaesthetic, especially when they remain conscious. Light percaine technique is safer when the head is kept low, whereas in heavy percaine anaesthesia the head is slightly raised. Finally, except for a slight tilt of from 5° to 10° there is absolutely no shifting of the patient under heavy percaine once the lumbar puncture has been performed. There is also less chance of the needle becoming dislodged when using a small quantity of fluid, as in heavy percaine technique, than there is when introducing five or six times as much fluid as in light percaine block, with less possibility of deposition of percaine outside the theca leading to partial failure. In other words, heavy percaine is less cumbersome to use and more comfortable to the patient, the second quality being more important than the first. It was particularly interesting to compare Dr. Mushin's article with that read at the Royal Society of Medicine by Dr. Frankis Evans last year. The former gives us the maximum doses to be used, the latter the minimum.

With regard to premedication, I agree most emphatically in condemning heavy respiratory depressants before a spinal anaesthetic. My choice lies between omnopon and scopolamine and nembutal and morphine. For urgent operations I premedicate with omnopon gr. 1/3 and scopolamine gr. 1/150, and give a small dose of pentothal on the table prior to the lumbar puncture if the condition is painful, like a perforated gastric ulcer in a robust subject. For prearranged cases I give nembutal gr. 3 two and a half hours before operation, with morphine gr. 1/6 later, depending on the action of the nembutal. Both types of case receive N_2O+O_2 when the operation takes place in the upper abdomen. CO_2 absorption, of course, should be combined to control the depth of respiration. Cases for spinal anaesthesia must be chosen carefully. The upper abdomen must not be considered as a bar to spinal. That is akin to saying, "I do not use chloroform because I am afraid of it or it is dangerous." Most gastrectomies do better under endotracheal inhalation anaesthesia, but one occasionally experiences the robust subject who simply will not relax under inhalation anaesthesia, and here it is so important to achieve relaxation *before* the peritoneum is opened, otherwise it retracts from the wound and is again "difficult" when it comes to sewing up.

With regard to sterilizing of instruments, I have had some disappointments using distilled water, even when HCl has been added, probably because the bowls coming from ordinary

sterile water are not entirely free from alkali. I now keep all instruments in spirit and first dry them with sterile swabs, then rinse them in ether, then draw up a minute quantity of the anaesthetic solution to rinse out the syringes and needles. I have had no failures using this technique.

Finally, the substitution of phedracin for ephedrine is a distinct advantage.—I am, etc.,

Bristol. W. M. MAIDLOW, M.R.C.S., D.A.

Scabies and Impetigo

SIR,—Many years ago I heard a very recent and *irreverent* graduate in medicine define a dermatologist as "a practitioner who can cure scabies." But despite this rather cryptic definition it appears now that a dermatologist does not know when he has effected a cure. He requires the assistance of an entomologist. One gathers that a negative report from him settles the problem. A negative report from a pathologist, however, does not, for example, settle the absence of tuberculosis or syphilis. It is merely one item of evidence to be taken for what it is worth in conjunction with the clinical evidence.

To-day a great deal is known about scabies: its exact cause and exactly how it acts. *Felix qui potuit rerum cognoscere causas.* If so, we should all be very happy about scabies. But it is still unfortunately very prevalent, though there are now a number of cures besides sulphur. Each cure has its adherents. The disease is not dangerous to life. This is surely a situation in which experiments with controls are justifiable and, indeed, clearly indicated. I have on the whole been most impressed by the reports on rotenone solution. But even if it should prove to be the most efficient of competing cures there will still remain the problem of mental defectives and carriers with natural or acquired immunity. The extirpation of this disease seems at present an unattainable ideal.

The good result in impetigo, reported by Dr. F. Glyn-Hughes (October 18, 1941, p. 560), from comparatively small doses of sulphanilamide is very interesting. Dr. Alexander Fleming originally pointed out that the action of these amazing new drugs is bacteriostatic rather than bactericidal. Sir Almroth Wright's recent important pronouncement (January 10, p. 50) that these drugs stimulate the leucocytes to increased phagocytic activity seems to clear the way for a more accurate estimate of dosage consistent with efficiency and freer from the risk of agranulocytosis. Is it not probable that too large doses depress phagocytic activity? What concentration of the drug in serum has the maximum stimulating effect? If this were generally known doses might be better and more safely adjusted by reference to body weight.—I am, etc.,

Manchester. J. STAVELEY DICK.

Evolution as a Factor in Foot Disorders

SIR,—Like all evolutionists, Mr. Norman C. Lake, in his article of January 10 (p. 31), puts the cart before the horse by deducing cause from effect. We are not to take such conditions as hallux valgus as an acquired pathological one but as a natural variation of the foot "evolving" from that of a tree-dwelling monkey (*sic*) to that of man. After much theorizing and speculation, Mr. Lake finally clinches his argument with six "indisputable" observations. On examination these prove to be singularly unconvincing. Let us examine them.

Nos. 1 and 2—that hallux valgus occurs in those who have always worn rational footwear and in both sexes, but especially in women. Without going back to the Cainozoic era, is the explanation of this not rather to be found in the construction of the modern "rational" shoe? It frequently converges towards the toe on its inner side, instead of having a straight inner side, with all the convergence on the outer side. Few of us, if any, have avoided wearing such a shoe some time in our lives. It is seen in its extreme form in women's shoes—for example, the court shoe. Here the shoe converges from both sides in order to grip the toes and stay on the foot. Naturally women suffer more frequently from hallux valgus. Another factor in the production of hallux valgus in both sexes is the habit of turning the toes out in walking.

Nos. 3 and 4—that the great toe is rotated as in the anthropoids and is often associated with hammer toe. By simply observing the sequence of events of hallux valgus in the human, without any assistance from the anthropoids, the above is easily explained. As the toe deteriorates into the valgus position the tendon of abductor hallucis slips under the head of the metatarsal, and this, in conjunction with the other structural attachments round the joint (and sesamoid bones), can result in only one thing: rotation. The abducted great toe is now pressing heavily upon the distal end of the second toe, and it becomes "crowded" into the "hammer" position. It is quite obvious to any unprejudiced mind that the exciting factor in producing the valgus deformity is pressure on the side of the great toe, and the subsequent abduction of the first metatarsal is purely secondary.

No. 5—that hallux valgus is almost invariably associated with a splay-foot. Of necessity it must if the degree of hallux valgus is at all marked. The function of the foot is disordered and its balance is altered. The weight, instead of going through the head of the first metatarsal, is transferred through the second and third. As the weight goes forward on to the toes the great toe will now exert leverage upon the side of the head of the first metatarsal, aggravating abduction of this bone and splaying or spreading of the fore-part of the foot.

Mr. Lake illustrates the remaining point—that the condition occurs in those who have never worn shoes—by two diagrams. The first—a radiograph of a newly-born infant—shows the great toe in abduction, a feat easily within the capabilities of most infants. The first metatarsal, however, shows no sign of abduction. It seems a fairly normal infant's foot. The second illustration is the footprint of a negro, and by it one might prove several things. We will, therefore, not comment on it until more concrete evidence is forthcoming. Sir Arthur Keith has written: "No human foot has ever been seen either in human foetus or in primitive native races in which the great toe was separated like a thumb, as is the case in all apes." Perhaps Mr. Lake has seen one?

In conclusion, it would seem that the evidence put forward by Mr. Lake is not sufficient to alter the opinion that hallux valgus is an acquired pathological condition uninfluenced by evolution; nor, conversely, does it in any way support the theory of evolution. If we profess to be searching for the truth, as Mr. Lake does, then we ought to avoid the danger of building upon hypothetical explanations instead of well-authenticated fact. Even Prof. T. H. Huxley realized the danger of this when he wrote: "I have abstained from discussing questions of aetiology, not because I underestimate their importance or am insensible to the interest of the great problem of evolution, but because, to my mind, the growing tendency to mix up aetiological speculations with morphological generalizations will, if unchecked, throw biology into confusion." How that tendency has since grown!—I am, etc.,

Belfast. H. J. DUFFIELD.

Haemoglobinometry

SIR,—On December 27 last you published on page 926 a letter from Dr. Kay and me on estimations of haemoglobin in pregnancy. Dr. Kay reported the determinations in about 2,000 patients attending an ante-natal clinic during 1937 and 1938. I gave figures for more than 800 patients in 1940 at the same hospital. The average of the series in 1940 was much lower than that for 1937 and 1938. At about the time that the estimations in 1940 were completed the Haldane haemoglobinometer standard which had been used during that year was seen to have become slightly brownish, but when I compared it with a standard authenticated by oxygen-combining power I believed that, in spite of the defect mentioned, it gave identical readings with the authenticated apparatus. Recently, however, the standard used by us in 1940 has been found to be clearly unsatisfactory, and it is evident that the discoloration has given rise to many falsely low estimations. For this reason I regret to have to say that the comparison which was made between conditions before and since the beginning of the war cannot be upheld. The figures given by Dr. Kay for 1937 and 1938 are not involved in this error in any way.

The unsatisfactory state of many of these standards has been noticed during the last two or three years, and takes the form of either a rapid fading or a brownish dis-

coloration and darkening. At the present time the British Standards Institution is preparing a specification for reliable standards, but the manufacturers of them have informed me that they have not yet a good supply of the apparatus which meets the specification and in which they have overcome the difficulties causing the progressive deterioration. In the meantime standards should be checked more frequently than was done before the war. The National Physical Laboratory, Teddington, for example, undertakes such service.—I am, etc.,

London, N.19. J. M. ALSTON.

Refitting for Industry

SIR,—With reference to the article (February 14, p. 231) relating to the newly organized Birmingham Accident Hospital, I beg you will allow a correction to be noted merely in the interest of historical accuracy, and if only for the benefit of those who have not had time to follow closely during the last five years the developments in the treatment and rehabilitation of industrial injuries.

The Birmingham Accident Hospital is not the first accident hospital in Great Britain organized on the lines described in the article, because the Albert Dock Hospital and Rehabilitation Centre, London, E.16, was opened by the Seamen's Hospital Society in 1938. The system described as being followed at Birmingham appears to be based exactly on the pioneer methods of Mr. H. E. Griffiths, M.S., F.R.C.S., surgeon to the Albert Dock Hospital—namely, graduated and supervised recreational exercises as part of continuous hospital treatment. Restoration to earning capacity is the aim of the Albert Dock Hospital and Rehabilitation Centre, and patients are retained under treatment in the hospital until this has been achieved or the best possible end-result obtained. Close contact with industry, the management, medical officers, and welfare workers is maintained from the date of the patients' admission and plays an important part in their response to treatment. The Shipping Federation and large industrial concerns of the district have given generous financial assistance, but the Seamen's Hospital Society has received no financial aid either from the Ministry of Health or from the London County Council.

Among the publications giving particulars of Mr. Griffiths's methods as carried out at the Albert Dock Hospital may be cited the report (illustrated) of the Interdepartmental Committee on the Rehabilitation of Persons Injured in Industry (the Delevingne Committee, 1938) and the evidence taken by the Royal Commission on the Workmen's Compensation Acts, to whom an exhibition of the cinema film of the Albert Dock Hospital organization at work was given at their request.—I am, etc.,

F. A. LYON,
Seamen's Hospital, Greenwich. Secretary, Seamen's Hospital Society.

Influenza Virus

SIR,—Unfortunate publicity was given in the lay press to the isolation of an influenza virus at this Institute.

During an epidemic of influenza at certain of our military camps Dr. J. H. S. Gear obtained throat and nasal washings from several cases. These were instilled intranasally into mice. After eight to twelve passages in the case of three strains the mice began to develop pneumonic lesions which were bacteria-free. It was considered reasonably probable that the virus of influenza was responsible for these lesions.

In a Press interview regarding military activities of this Institute it was mentioned that in addition to the preparation of the usual vaccines, such as antitetanus, antityphoid, and antityphus, we hoped to be able to prepare anti-yellow-fever vaccine and also perhaps anti-influenza vaccine, since we had recently succeeded in isolating the virus from local military patients. No claim was made that this was the first time that this virus had been isolated or that it was a discovery of very great importance. Unfortunately the Press looked upon the announcement regarding influenza as a "scoop," and emphasized it out of all proportion and added many entirely inaccurate frills, to the great embarrassment of the staff of the Institute.—I am, etc.,

E. H. CLUVER,
Director, South African Institute for Medical Research.
Johannesburg.

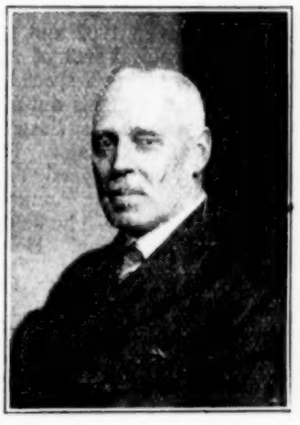
Obituary

SIR JOHN HEBB, C.B., C.B.E., B.M.

Formerly Director-General of Medical Services, Ministry of Pensions

As announced in an earlier issue, Sir John Hebb died at Ronkswood Hospital, near Worcester, on February 16. He was 63 years of age.

John Harry Hebb, son of the Rev. H. A. Hebb, headmaster successively of Exeter Grammar School and the Royal Masonic School, Bushey, was educated at Kelly College, Tavistock, at St. John's College, Oxford, and at the Westminster Hospital, where, after graduating B.A., he gained the University Scholarship. His uncle, Dr. R. G. Hebb, a remarkable man little known to the profession at large, was at that time physician and physician-pathologist to the Westminster. After taking the B.M. and B.Ch. degrees at Oxford John Hebb held the posts of senior house-surgeon at the Westminster and house-physician at the Bethlem Royal Hospital. He settled in private practice in Oxfordshire, in which county he was an assistant medical inspector of school children. In 1915 he joined the R.A.M.C. and served in the Mediterranean Expeditionary Force, being ultimately promoted to the rank of major and receiving the award of O.B.E. After the war he did not return to private practice but joined the Ministry of Pensions, where his undoubted flair for organization and medical administration found full scope. He filled various posts in the Ministry, finally succeeding Sir Lisle Webb in 1933 as Director-General of Medical Services. He was created C.B.E. in 1928 and C.B. in 1937, and in this latter year was appointed Honorary Physician to the King, as one of the heads of the three Civil Departments—Ministries of Health and Pensions and the London County Council—with extensive civilian medical services. He held this appointment until he retired in 1941.



The imminent threat of war in 1938 called for his services in another capacity, and in the summer of that year he was seconded to the Ministry of Health in order to organize the hospitals of the country, both voluntary and municipal, and expand their capacity by many thousands of beds in order to meet what might have been a very large number of casualties both among the civil population and the members of the Forces. When the immediate threat of war passed Hebb addressed himself to the preparation of a long-term plan which included the improvement and expansion of existing institutions, the provision of new accommodation by building, and the necessary expansion of medical and nursing staff to deal with large increases of in-patient treatment. For much of this work he was specially qualified by his experience in the Ministry of Pensions, where for several years he was in charge of the hospital section, and by his natural aptitude for building and design. Early in 1939 he was made responsible for the supervision of the plans submitted for first-aid posts by local authorities. Hebb built well, and when his plans were put to the test after Dunkirk, and in the subsequent bombing of the cities of the country, they were not found wanting. In 1940 he had an attack of coronary thrombosis, and although he made a good recovery he disregarded the warning and continued working. Even when he retired in 1941 he could not rest content, but took the post of medical superintendent of the new Ronkswood Hospital, Worcester. It was while he was preparing the hospital for the reception of patients that the second and fatal attack of coronary thrombosis occurred. For his excellent work for the Emergency Medical Services he received the honour of knighthood.

Hebb's one interest in life was his work, and to that he subordinated everything, even his health. He was a master of detail, and his reluctance to delegate to others the working out of the comprehensive plans the Emergency Service required added unnecessarily to the burden which he was called on to carry. But a leisured retirement had no appeal to him, and he died, as he would have wished, while working at one of the hospitals which he himself had planned.

[The photograph reproduced is by Elliott and Fry, Ltd.]

J. ALDREN WRIGHT, M.D.

Dr. John Aldren Wright, consulting physician to Addenbrooke's Hospital, Cambridge, died at his residence on February 12, aged 77 years.

He qualified in medicine at Cambridge University in 1894, after clinical study at St. Mary's Hospital, taking his M.A. and M.D. degrees in 1902 and the M.R.C.P. in 1911. He was on the active medical staff of Addenbrooke's Hospital for twenty-seven years, taking a special interest in skin diseases, to which he devoted one of his out-patient clinics. During the last war he served with the 1st Eastern General Hospital as a physician with the rank of major. He was a teacher and examiner in medicine in the University, and a member of the B.M.A. over many years. At the Annual Meeting of the Association held at Cambridge in 1920 he held office as honorary secretary of the Section of Medicine. He leaves a widow, a son, and a daughter.

A former colleague writes:

It is a misfortune that a generation may grow up in an active institution such as a hospital with but little knowledge of their immediate predecessors. This thought comes to the mind when dwelling on the death of my old friend and colleague Dr. J. Aldren Wright. Only those who worked with him realize what he did for the reputation of the hospital and the good of those attending it during a long succession of years. He was the embodiment of punctuality and thoroughness combined with deep knowledge and a very common-sense application of it. Nothing interfered with his hospital work, and no one more conscientiously sacrificed all outside claims when the priority of routine hospital work was at stake. Among his contemporaries respect and esteem were the inevitable response; and that he was likable in himself and never cognizant of his virtues did not detract from the homage due and given. Dr. Wright extended his guidance and help in other directions where the welfare of the profession was concerned. He was honorary secretary of the hospital staff for many years, and held the same responsible post in connexion with the Cambridge Medical Society. He was a man widely read, especially in history, of sincere religious convictions, and of a quick active mind devoid of superficiality. He served his day and generation well, and leaves nothing but pleasant memories.

HUGH MILTON STEWART, M.A., M.D.

With the death, on February 23, of Hugh Stewart, medical practice in South London has lost a well-known figure, held in affectionate regard by a wide circle of professional colleagues and of grateful patients.

Born at Port Elizabeth, Natal, in September, 1868, his father being then the general manager of the Standard Bank of South Africa in that city, Hugh Stewart was brought to England for his schooling and university course. A scholar at Dulwich, he went with an exhibition to Christ's College, Cambridge, from which he graduated in 1890 with a First Class in the Natural Sciences Tripos, and then entered Guy's Hospital with a scholarship. At Christ's he had made friendly contact with Arthur (late Sir Arthur) Shipley, and their association later became closer through Stewart's marriage with Shipley's younger sister, Lillian. From Guy's he graduated M.B., B.Ch. in 1894, proceeding to M.D. in 1897. Meanwhile, in 1895, he had joined the oldest medical partnership in the Dulwich area, and he was to retain his association with it, and with the life of Dulwich and the neighbouring district, for more than 46 years.

There must be many for whom the memory of Hugh Stewart will stand as a type of the family doctor at his very best. True to this type, he readily, amid the claims of a busy private practice, undertook a range of voluntary duties and gave to them the best of his ability and attention.

In 1901 he joined the honorary staff of the South-Eastern Hospital for Children, Sydenham, as assistant surgeon, becoming senior surgeon in 1919, and retaining this position till 1938. From 1919 he acted also as physician to the eye and skin departments of the same hospital. His colleagues there learned to value highly his clinical acumen, and called with confidence on his ordered store of experience in any case of difficult diagnosis. Not less did they value his unfailing generosity and good feeling, and the friendly atmosphere which his character did so much to maintain in the proceedings of their house committee. Then for 25 years he shared with his partners the medical service to the Church of England Waifs and Strays Home, and for 20 years he was honorary medical officer to the Edith Cavell Home for Nurses, Gipsy Hill. During the war of 1914-18 he served as a civilian surgeon to the Southwark Military Hospital, East Dulwich. He was an active member of the Sydenham District Medical Society, acting as its secretary for 25 years and keen to maintain its traditions and the scientific interest of its meetings. For 20 years, again, he acted as medical officer to Dulwich College and to the two neighbouring preparatory schools. Throughout his professional life he was a loyal member of the British Medical Association, and no more suitable appointment could have been made to its Subcommittee on Middle-class Hospital Policy, on which he served in 1928.

In a life so full of duties, cheerfully accepted, for colleagues, patients, and neighbours, little leisure was left for sports in the ordinary sense, and Stewart's participation in ball games, after his College days, was mostly vicarious. But he was no dull devotee. He cultivated his garden with enthusiasm and skill, and with a success above the level usual in a district so near to Central London. Spells of holiday, spent with his family, gave brief but welcome scope to his deep love of the country and to his interest in the study of wild life; on many of these occasions he made planned additions to a collection of lepidoptera, the scope of which, in a man with little leisure for a hobby, gave strong evidence of the born naturalist. He found time, too, for good reading and loved to talk with chosen friends when the day's work was done. On a more formal side of social enjoyment, he was a member of the Dulwich Club—a dining club with 170 years of history—and served for many years as its treasurer.

Hugh Stewart was almost culpably modest about his own attainments, just as he was unfailingly generous in his appraisement of others. In fact, with his quiet culture, his carefully garnered experience, and his ripened wisdom, he was an exceptionally good doctor; and there are many who will remember him also as one of the kindest, the most generous, and the most loyal of friends. Their sympathy will go out to his widow, and to the two sons and three daughters of their perfect marriage.

H. H. D.

Dr. FREDERICK FIELDING BOND, who died suddenly on February 8 at Malton, Yorks, had practised for many years at Rastrick. He was born at Accrington in December, 1861, and was educated at Christ Church School in that town and at the University of Edinburgh, where he graduated M.B., C.M. in 1884 and M.D. two years later. After settling in practice at Rastrick he took the D.P.H. of the English Conjoint Board and became M.O.H. for the district and superintendent of the Brighouse Small-pox Hospital. During the last war Dr. Bond held a commission as captain, R.A.M.C., and was medical officer in 1915-17 to the Brighouse V.A.D. Hospital. In 1927 he was acting as ship surgeon in the African Steamship Company's Line, and contributed a letter to the *British Medical Journal* on wireless calls for medical help at sea; this was followed by a copy of suggestions for wireless medical consultations at sea made by him to the Board of Trade (Mercantile Marine Department). He joined the British Medical Association in 1889, but resigned five years ago on account of failing sight and disability caused by several accidents.

Medico-Legal

A WORKMAN'S REFUSAL OF AMPUTATION

One of the conditions of the award of compensation to an injured workman is that he shall undergo such treatment as is reasonably necessary to restore him to health. Until recently the courts had never had to decide whether it was unreasonable to refuse to allow a foot to be amputated. The Court of Appeal, however, dealt with this point on February 11.[1] A workman had one of his feet so badly crushed that a large part of the bone had to be removed, and at the time of arbitration in October, 1941, he still suffered considerable pain. He could walk two miles slowly with a stick, could stand, and did not have to use crutches. Early in 1939 he was examined by an eminent surgeon, who expressed the opinion that the foot should have been removed. In the following May the same surgeon said that it would be wise to have the foot amputated, but the workman declined to have that done. In July, 1941, the employers started proceedings to end their payment of compensation on the ground that the workman refused to undergo a reasonable surgical operation. In September, 1941, another eminent surgeon said that, unless the foot became worse, to amputate it would be high-handed, and he did not advise that this should be done for the present. The county court judge had found, however, that the workman's refusal was unreasonable, and reduced his compensation from 30s. to 20s. a week. The workman appealed, and during the argument Lord Justice Goddard remarked that, even if the workman consented, the employers were not obliged to provide him with an artificial foot. Their counsel thereupon undertook on their behalf that he should be provided with an artificial foot to be maintained and renewed as long as necessary. Nevertheless, the court would not agree that his refusal was unreasonable. The Master of the Rolls emphasized that the operation would deprive him of a foot which, at any rate at present, was of some use to him. Whether or not it might be unreasonable for a workman to refuse to undergo such an operation if he had been advised to have it and effective provision had been made to supply him with an artificial limb was another question. This workman could not be said to have acted unreasonably in refusing to have his foot amputated, with no security for obtaining the necessary artificial limb. The Master of the Rolls added that where the provision of an artificial limb was necessary that matter must be most strictly attended to. The county court judge should have taken this into account. Where two eminent surgeons gave diametrically opposite advice about a major operation, a workman who accepted the view of one rather than of the other could not be called unreasonable. The court therefore allowed the appeal and restored the man's full rate of compensation. In most other industrial countries this workman would have been guaranteed an artificial limb as a part of the medical benefit which is included in any sensible scheme of workmen's compensation.

REFUSAL TO SUBMIT TO MEDICAL EXAMINATION

The National Service (Armed Forces) Act, 1941, prescribes a penalty not exceeding a year's imprisonment for refusing to submit to medical examination when called up for service. The Divisional Court of the King's Bench Division recently heard an appeal by the Ministry of Labour and National Service against a decision by the Norwich justices to discharge under the Probation of Offenders Act a conscientious objector who had pleaded guilty of refusing to obey an order of the Bench to submit himself for medical examination. A majority of the justices formed the opinion that the defendant was of good character and antecedents and had refused to submit to medical examination because of his conscientious objection to serve in any capacity, non-combatant or otherwise. Thinking that a conviction would merely prevent him from doing the work he was willing to do, they decided that he should be released on probation on condition that he should be of good behaviour and appear for conviction and sentence when called upon at any time during the next twelve months, and should seek ambulance work or similar work under the Society of Friends or the Peace Pledge Union, or agricultural work.

The Ministry of Labour appealed to the High Court on the point of law that this was not an offence which could lawfully be dealt with under the Probation of Offenders Act. Mr. Justice Humphreys, reading the reserved judgment of the court, agreed that the majority of the justices had acted in excess of jurisdiction and contrary to the law. It was, the court said, no part of their duty to decide whether and to what extent the defendant was a conscientious objector. That decision was one for the special tribunals. Even if the tribunal had placed him in the category of persons whose conscience allowed them to perform useful civil work, it would have been for the tribunal to direct the work; the justices had left to the defendant himself the choice of the work he was to seek but apparently need not undertake. Neither the language of the Probation Act nor any judicial decision supported the proposition that proof of the defendant's good character was sufficient to justify the Bench in putting him on probation irrespective of the nature of the offence or the circumstances of its commission. Here the justices had before them a person who was confessing to a deliberate refusal to obey the law and in effect announcing his intention to continue in that disobedience. The defendant's offence consisted in his failure to obey an order of the court itself, and to such a case the Probation Act had no application. His Lordship doubted, indeed, whether the Act could be properly applied to any deliberate refusal to obey the National Service Acts. The Probation Act was a valuable and useful law, and courts of summary jurisdiction had wide discretion, but this Act was not to be used as a means of evading the law or of encouraging persistent offenders in their contumacy.

The Divisional Court therefore sent the case back to the justices with a direction to convict the defendant, the amount of the penalty being left to them. The interesting feature of the case is perhaps the sympathy with which the majority of the justices regarded the claim of the defendant to set his conscience above the order which they themselves had imposed upon him.

[1] Redpath, Brown and Co., Ltd., *v.* Hayes: *Times*, February 12, 1942.

A DOCTOR'S DILEMMA

In the *Journal of Urology* for November, 1941 (**46**, p. 1018) Dr. Elmer Belt of Los Angeles describes a dilemma which may face other medical men. He operated on a patient in whom he had made a correct diagnosis of carcinoma of the prostate. He informed the family of his diagnosis, and the patient's daughter asked him to conceal it from her father, in view of the fact that the mother had already died of cancer of the breast; she felt the father would be too depressed by the news to stand it. The patient was operated on successfully, and later discovered what the diagnosis was. Thereupon he filed a suit against Dr. Belt for $113,500 for hiding the diagnosis from him, stating that if he had known the true facts he would never have entered into certain financial commitments. He was aware that the daughter had taken a part in the concealment of the information from him. The medical defence agencies which were preparing to defend Dr. Belt pointed out that he might well be held responsible in court, and that in future he ought always to get a responsible member of the family to sign a statement to the effect that the diagnosis should be withheld from the patient. The outcome is best given in Dr. Belt's words: "I cannot tell you the answer to the problem, as to how it would appear in court, because the other day, just before I left Los Angeles, we held a celebration in our office, the first time we ever held a celebration over a patient's death. The man died just as the suit was about to come to trial."

N. Blumenberg and L. Zisserman (*Med. Record*, 1941, **154**, 349) record a case of primary *Streptococcus viridans* meningitis in a man, aged 42, who recovered after administration of 59 grammes of sulphapyridine by mouth and 34 grammes intravenously within six days of the onset. He developed temporary azotaemia and marked cyanosis, but these symptoms disappeared rapidly after the drug was stopped. Recovery was complete and uneventful.

The Services

A *Supplement* to the *London Gazette* dated February 24, 1942, announces that the King has approved the appointment of H.M. The Queen to be Colonel-in-Chief of the Royal Army Medical Corps.

R.N.V.R. OFFICERS' DECORATION

The King has approved the award of the R.N.V.R. Officers' Decoration to Surgeon Commanders Basil William Crowhurst Archer and Albert Stanley Bradlaw, and Acting Surgeon Commander Hugh Mason Willoughby, R.N.V.R.

ARMY AWARDS

The King has conferred the Efficiency Decoration of the Territorial Army on Colonel A. McK. Reid, M.C., and on Lieut.-Colonel (Acting Colonel) A. MacG. Duff and Lieut.-Colonels A. Bremner, M.C., and W. J. McIntosh, R.A.M.C. (T.A.).

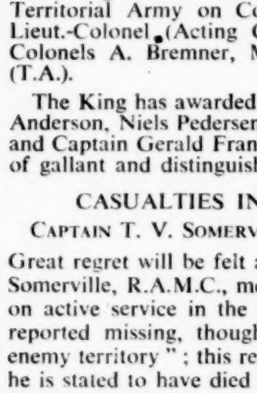
The King has awarded the M.C. to Captains Charles Douglas Anderson, Niels Pedersen, and John Stobo Pritchard, R.A.M.C., and Captain Gerald Francis Adye-Curran, I.M.S., in recognition of gallant and distinguished services in the Middle East.

CASUALTIES IN THE MEDICAL SERVICES

CAPTAIN T. V. SOMERVILLE, O.B.E., D.S.O., M.C. with Bar

Great regret will be felt at the death of Captain Thomas Victor Somerville, R.A.M.C., medical officer of the 3rd Hussars, while on active service in the Middle East. On June 1 last he was reported missing, though believed to be alive and well "in enemy territory"; this report was repeated in September. Now he is stated to have died on November 23. Somerville was 54. He was born of Scottish parents in Ceylon, where his father was a planter. His mother was a sister of the late Sir James Yuill. Somerville was sent home to be educated at Framlingham. Thereafter he trained and qualified M.R.C.V.S.Lond., proceeding immediately to study medicine at the London Hospital in order to obtain the double qualification—in medicine as well as in veterinary surgery—to prepare himself the better for future work abroad. He obtained the M.R.C.S., L.R.C.P. in 1914. After taking a course at the London School of Tropical Medicine, Somerville was appointed house-physician and house-surgeon at the Royal Sussex Hospital, Hastings. When there were rumours of war in 1914 he resigned his appointment and joined the Army—the day before the outbreak of war—proceeding to France with the Expeditionary Force. At first he was attached to the Field Artillery, being transferred later to the 2nd Battalion the Highland Light Infantry. After the armistice Somerville went to Russia with the 1918 Expeditionary Force, returning home with this Force after nine months' service there. In 1916 he was awarded the M.C. for an act of conspicuous gallantry near Ypres, and in 1918 a bar to the M.C. for many acts of courage and bravery while he stayed behind during the March retreat to tend the wounded. In November, 1919, he was awarded the O.B.E. (Military Division). For a year he held the appointment as civil surgeon at Baghdad, then came back to England, settling in general practice at Monkseaton, near Newcastle. About fifteen years ago he came to Bournemouth, continuing in general practice in the Winton area there. Soon after the outbreak of the present war Somerville, although over 50, volunteered again, and saw active service in Libya. On May 6 last he was gazetted as having been mentioned in dispatches for distinguished services in the Middle East. In the same number of the *London Gazette* (dated May 6) was the notification of the award to him of the D.S.O. "in recognition of gallant and distinguished services in the Middle East." In the *Listener* of May 1, 1941, is the record of a broadcast, which many will remember having heard, made by a B.B.C. observer in the Middle East, in which he described incidents of astonishing bravery on the part of Captain Somerville. One of these he narrates thus: "After Sidi Barrani, during the advance towards Sollum, Somerville was to be seen driving about, under intense fire, sitting on the top of his 'dingo' with shells bursting all round and machine-gun bullets whistling past. Why he wasn't killed I don't know. Backwards and forwards he went fetching and tending his wounded men till all had been seen to." Thomas Somerville was of a quiet, retiring disposition, never strong physically, and of gentle temperament; a man of deeds rather than words; brave as a lion; there was none braver or more gallant. Much sympathy will be felt by a large circle of friends with his wife and married daughter, who, after waiting in dreadful suspense for so many months, have now to mourn his loss.

S. W. S.



War Substantive Captain GUTHRIE MORGAN WADSWORTH is included as "Died" in an Army Council Casualty List published on February 21. He was born on December 17, 1899, and was educated at the University of Leeds, graduating M.B., Ch.B. in 1923, and at University College, London, taking the diplomas of M.R.C.S., L.R.C.P. in 1924. He had held the post of first house-physician at the General Infirmary at Leeds, and had practised in Durham, Merionethshire, Lincolnshire, Surrey, and Kent, and at the outbreak of war was living at Blackheath, London. He entered the R.A.M.C. as temporary lieutenant in September, 1939, and was promoted captain a year later. He had been a member of the British Medical Association for fifteen years.

Lieut. RICHARD HUGH SMITH died at Enniskillen, Ireland, on February 18. He was educated at the University of Cambridge and St. Thomas's Hospital, and qualified M.R.C.S., L.R.C.P. in 1932. He held the post of casualty officer and house-surgeon at the Royal Berkshire Hospital, Reading, before settling in practice at Aldershot. In 1935 he moved to Poole, where he resided until he joined the R.A.M.C. as temporary lieutenant in December last year.

DEATHS IN THE SERVICES

SURGEON REAR-ADMIRAL F. L. SMITH, O.B.E., R.N.

The sudden death on February 18 at the age of 60 of Surgeon Rear-Admiral Frank Lewis Smith has come as a great shock to his many friends and acquaintances both in and outside the Services. His general disposition and cheery manner had endeared him to many, while his extensive knowledge of Service matters and of affairs in general was always at the disposal of those who cared to ask; nothing was too much trouble for him, and if he did not know the answer he could always suggest a way to find it. His organizing ability was of a high order, and his energy in carrying out his duties was unremitting: that he died on his way to work in "the Department" which he loved is probably what he himself would have wished, though both the Navy and the Medical Branch are the poorer for it.

Born in 1881, the son of Ralph Smith of Whitby, he was educated at Dulwich and underwent his medical training at St. Thomas's Hospital. He entered the Royal Navy in November, 1909, and after service in China returned to England shortly before the outbreak of the last war, and served in the Royal Naval Hospital and Dockyard at Pembroke Dock till 1916. Thence he joined H.M.S. *Caroline* in the Grand Fleet, and later he was appointed to the Royal Naval Hospital, Chatham, where he served as specialist in *x* rays. After further sea service as senior medical officer of the aircraft-carriers *Hermes* and *Furious*, he came to the Admiralty in 1926 as assistant to the Medical Director-General, and remained until promoted to surgeon captain in 1931. After promotion he went as principal medical officer of the Royal Naval Barracks, Portsmouth, and in 1934-8 was in medical charge of the Royal Marine Infirmary and Depot at Deal. In 1938 he was advanced to the rank of surgeon rear-admiral and placed on the retired list.

On the outbreak of war he was recalled to the Medical Department to take up his war appointment as principal medical transport officer for the Navy, a post for which his previous experience and organizing ability made him eminently suitable, and which he filled with such success that his place will indeed be hard to fill. His liaison with the other fighting Services, as well as the Ministry of Health and various Admiralty depots, was invaluable. He also acted as the link between the Medical Departments of the Navies of this country and the U.S.A. His

kindly personality and practical mind maintained a close and harmonious bond between the Services. During his long service at the Admiralty he had the unusual privilege of serving under five Medical Directors-General.

Lieut.-Colonel KENNETH MONTAGUE NELSON, M.C., R.A.M.C., died at Camberley on February 18. He was born on June 23, 1890, and received his medical education at St. Mary's Hospital, qualifying M.R.C.S., L.R.C.P. in 1915. He immediately entered the R.A.M.C. as temporary lieutenant, took a permanent commission in 1917, and was promoted captain in 1921, major in 1927, and lieutenant-colonel in 1940. He served in the war of 1914-18, was mentioned in dispatches in 1917, and received the Military Cross. He leaves a widow.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

W. W. C. Topley, M.D., F.R.S., F.R.C.P., Secretary of the Agricultural Research Council and formerly Professor of Bacteriology and Immunology, University of London, and Director of the Division of Bacteriology and Immunology, London School of Hygiene and Tropical Medicine, has been elected to an Honorary Fellowship of St. John's College.

At a Congregation held on February 28 a Grace was approved for conferment of a degree of M.A. upon Clarence Reginald Rapp, M.D.Toronto, University Demonstrator in Anatomy.

UNIVERSITY OF LONDON

At a meeting of the Senate on February 25 the degree of D.Sc. was conferred on F. R. Winton, M.D., professor of pharmacology at University College, and on C. L. Hewett, an internal student of the Royal Cancer Hospital.

The William Julius Mickle Fellowship was awarded to Alexander Fleming, M.B., F.R.C.S., professor of bacteriology at St. Mary's Hospital Medical School.

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL

Lecture

The fourteenth biennial Sydney Ringer Memorial Lecture will be delivered by Prof. F. R. Winton, M.D., D.Sc., in the lecture theatre of the school (University Street, Gower Street, W.C.) on Tuesday, March 17, at 4 p.m. His subject is "The Physical Factors Controlling the Formation of Urine." The lecture is open to all qualified practitioners and medical students.

Scholarships and Exhibition

The University College Hospital Medical School announces that two Goldsmid Entrance Scholarships, entitling the holder to the final course of medical study, will be offered for competition in July. They are open to students who are preparing for the degrees of the Universities of London, Oxford, Cambridge, Durham, or other British universities, or for the diplomas of the Royal Colleges of Physicians and Surgeons; also one Goldsmid Entrance Exhibition and one Filliter Entrance Scholarship in Pathology entitling holders to a reduction by £80 and £52 10s. respectively of the fees due for the full course of final medical study. Notice of intention to compete must reach the secretary of the school (from whom full particulars can be obtained), University Street, Gower Street, W.C.1, by July 4.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

Council Election

The Council has decided not to send out this year the circular generally known as the "first notice of the Council Election." It was felt that there would be no justification for the use of some 2,000 leaflets and envelopes merely to announce the date of the election and the date by which intending candidates must send in their nomination forms, especially as it has been found in the past that the majority of candidates send in their nominations before the issue of this circular.

Candidates for election must send in their applications to the Secretary at the College by Monday, March 16, as stated in the advertisement in this issue of the *British Medical Journal*.

The voting papers will be sent out to all Fellows in the usual manner on Friday, March 27, and the election is on July 2.

Medical Notes in Parliament

Ministry of Health Report

A summary report by the Ministry of Health for the period from April 1, 1939, to March 31, 1941, was presented to Parliament on February 26. For some time members had pressed for such a summary to be issued in lieu of the annual reports, which are in abeyance.

Medical Boards

Answering questions on February 12 about the grading of Army recruits, Mr. BEVIN said the decision as to grading was taken by the medical board and not by an individual doctor. There had, however, been eight cases in which appointments of chairmen or members of medical boards were terminated on account of unsuitability or inefficiency. In some other cases in which appointments were not continued relative inefficiency or unsuitability was one of the reasons. He could not give any precise figures under this head. The Medical Advisory Committee under the chairmanship of Lord Horder, which assisted the Department in making the arrangements for medical examination, had given it as their opinion that the proportion of men passed by the boards as fit for service and found later to be unfit was small.

Compensation for Injured Civilians

On February 17 Sir WALTER WOMERSLEY said that the Personal Injuries (Emergency Provisions) Act, 1939, provided for the grant of injury allowances in respect of war injuries and war service injuries, both of which were defined in the Act as physical injuries. Injuries to the brain as the direct result of concussion, and cases of shock originating from direct exposure to bomb explosion or blast in which the resulting incapacity for work started from the time of the incident, might be accepted as physical injuries for the purposes of compensation under the Personal Injuries (Civilians) Scheme. Compensation was not payable under the scheme for neurasthenia and similar sickness induced merely by apprenension and fears occasioned by enemy activity in which there was no physical injury.

Milk

Lord WOOLTON, in reply on February 18 to a debate on the distribution of milk, said he had encouraged the men engaged in the milk trade to eliminate by consent wasteful methods of distribution. There had been increased efficiency as a result. The Ministry of Food had diverted milk to areas where the national interest required it. In the northern half of England in December, 1941, 1,250,000 more gallons of milk were provided than in December, 1940. In the South of England production was up, but consumption was forced down. Only by such means could the Government be certain that children and invalids would have milk in the winter. The Government had used this vital food to preserve the national health. He proposed to maintain throughout the year this control over the distribution of milk, but hoped about the middle of March to increase the allowance of non-priority adults from the present 2 pints to 2½ pints weekly. A further increase would be made as soon as possible, but we should not, during the war, go back to unlimited supplies of milk. During the summer milk-powder, condensed milk, and cheese would be made for next winter, but it would be impossible to keep up the supplies of milk to the children of this country without the aid of the United States of America. He could not encourage the hope of any grandiose scheme of rationalizing milk retailing.

The Soap Ration

Major LLOYD GEORGE said on February 18 that Lord Woolton would carefully consider the soap requirements of infants and babies and of families unable to make use of the service of laundries, but had no evidence that the prescribed ration would not prove to be sufficient for every class of domestic consumer. He could not arrange to increase the soap ration in the area of the Metropolitan Water Board on account of the hardness of the water. At collieries where there were pit-head baths provision

had been made to enable miners to obtain soap free of the ration for use at such baths. The needs of other groups were under consideration. He would look into the possibility of freeing medicated soap from the requirements, or of issuing coupons for it against a doctor's certificate.

Typhus

Replying on February 19 to a question put down by Mr. Leach, Mr. ERNEST BROWN said precautions which had been taken against the entry of typhus included a close watch by medical officers at ports and airports; the organization and training of special mobile diagnostic and sanitary teams; arrangements for confirmation of diagnosis by experts; plans by local authorities for prompt isolation, hospital treatment, and supervision of contacts; and a general intensification of delousing and cleansing of verminous conditions, for which local authorities had recently been given additional powers. The Minister added that he had no intention of advocating the use of what Mr. Leach described as a vaccine made from typhus-infested intestines of lice.

N.H.I. Statistics

Mr. ERNEST BROWN circulated on February 19 the following statistics of the National Health Contributory Scheme for Great Britain for the year 1940 (the latest year for which the information is available):

Number of persons insured under the National Health Insurance Acts at the end of 1940 ..	22,300,000
Total of National Health Insurance contributions paid during that year	£30,700,000
Weekly amounts of contributions of	
(*a*) Employers	£300,000
(*b*) Workers	£290,000*
State contribution in 1940	£7,300,000†

* This sum includes payments made by insured persons themselves as voluntary contributors.

† The State contribution represents 1/7 of the amount actually expended in 1940 on benefits and administration in the case of men and 1/5 in the case of women.

Typhus in Germany: Inoculation of P.O.W.

Captain MARGESSON stated on February 19 that medical supplies for the prevention and treatment of typhus had been sent to Oflag VI B by the British Red Cross. Some typhus vaccine has been sent to the International Red Cross Committee for inoculation of British medical personnel in those camps where the International Red Cross Committee considers it necessary. A formal assurance has been given by the responsible official of the German General Staff that all measures for preventing the spread of the typhus epidemic have been taken.

German Doctors as P.O.W. in Britain

German medical officers who are prisoners of war in this country fall within the category of protected personnel. They are entitled to receive the full pay of their equivalent rank in the British Forces and to take exercise under escort outside the confines of their camp. They are not permitted to enter any house or shop or to make purchases except at the camp canteen.

National Flour?

Sir ERNEST GRAHAM-LITTLE asked the Lord President of the Council on February 24 whether he was aware that in August, 1940, the Medical Research Council reported that flour for bread should contain the wheat germ and that chemical bleaching of flour should be prohibited, but that up to the present 95% of the flour issued had been deprived of all its wheat germ and had been chemically bleached; and whether he would, in conjunction with the Ministry of Food, ensure that effect was given to the recommendations of the Medical Research Council. Sir JOHN ANDERSON said he was aware of the recommendations which the Medical Research Council had made on this subject. As regards the prohibition of chemical bleaching and "improving," the recommendation had been qualified by the statement that further investigation was necessary. The function of the Medical Research Council was to give scientific advice on the basis of existing knowledge and to promote research where that knowledge was inadequate. The action to be taken was primarily a responsibility of the Ministry of Food.

Exchequer Grants to Universities

On February 24 Sir KINGSLEY WOOD, in reply to a question from Sir Ernest Graham-Little, said that a year ago he informed the House that in view of the vital part played by the universities in the life of the community, the importance of maintaining so far as possible standards of university education, and the essential contribution of the universities towards the national effort, the provision for 1941 would be maintained at the same level as that for 1939 and 1940—namely, £2,149,000. The impact of the war on university finance had so far been less severe than was expected. On the other hand, while the repair of physical damage resulting from enemy action could be dealt with under the existing War Damage legislation, the repair of war damage was by no means the only problem involving large demands on university funds which would arise on the conclusion of hostilities. With these considerations in mind, the Government, after considering a report from the University Grants Committee, which reviewed the whole situation, had decided to maintain the provision for 1942 at its existing level.

Library at Netley

On February 24 Sir HERBERT WILLIAMS asked the Secretary of State for War if he was aware that there was no medical library at the Royal Victoria Hospital, Netley; and if he would take immediate steps to provide one. Mr. SANDYS, who replied, said that a medical library already existed at the Royal Victoria Hospital, Netley. Sir HERBERT asked if Mr. Sandys was aware that the medical library was so out of date that ten days ago the medical staff were unable to obtain the necessary medical references for a peculiarly difficult case.

Mr. SANDYS said he would inquire further into this particular point.

Panel Lists.—Sir LEONARD LYLE was informed by Mr. Brown on February 19 that the calling up of civil doctors had increased the average number of panel patients per working panel doctor, but in view of the connexion with call-up statistics it would not be in the public interest to indicate the extent of this increase.

EPIDEMIOLOGICAL NOTES

G.P.s and Diphtheria Immunization

At a conference last week Sir Wilson Jameson, Chief Medical Officer to the Ministry of Health, said that until at least three out of every four, or, better still, four out of every five, children are immunized against diphtheria "we cannot expect to see any effect on the annual figures of patients and deaths in the country as a whole." There is especial need for a higher rate of immunization of children between 1 and 5 years of age. No one is better placed than the general practitioner to persuade parents to have their children immunized. We therefore urge general practitioners to use every opportunity for forwarding this highly important public health measure—the elimination of diphtheria from this country.

In December, 1940, the Ministry launched a scheme of free immunization for children between 1 and 15 years of age. Supplies of toxoid were provided free to local authorities, who made extensive arrangements for giving children a course of immunization at schools and clinics. Sir Wilson has given the results of that campaign up to the end of December.

The figures actually cover the period starting January 1, 1940. The total number of children immunized in England and Wales up to September 30 last was 2,021,229, consisting of 1,573,487 school children and 447,742 children under 5. Sir Wilson stated that the Ministry concentrated on a campaign for immunization of as many children as possible during the spring and summer months in order to give them protection against the risks of winter. In the six months April to September children were immunized at an average rate of 300,000 a month, or 10,000 a day. In the three months September 30 to December 31 the number of children treated was 296,000, consisting of 205,000 school children and 91,000 "under-fives"—that is, at the rate of 100,000 a month. Up to December 31, 1941, the total is therefore 2,317,000, made up of 1,778,000 school children and 539,000 "under-fives." The figure represents about 27% of the child population of England and Wales under 15 years of age. Allowing for children still under 15 who were

immunized before January 1, 1940, and for children whose parents have had them immunized by private arrangement with their own doctors, Sir Wilson estimates that about one-third of the child population had been immunized by the end of December.

Discussion of Table

In *England and Wales* the largest difference between the returns for the week under review and the previous week was shown by pneumonia, which decreased by 332 cases. The lowered incidence was general throughout the country, the only exception being Lancashire, where the number of cases rose by 14.

The figure for measles was 182 in excess of the preceding week's. The disease has increased in incidence for four consecutive weeks, and notifications are now double what they were five weeks ago. The largest county total was that of Surrey, with 318 cases, approximately one-sixth of the total for England and Wales. Only three other countjes recorded a notable increase during the week: Middlesex, from 105 to 163; Warwickshire, from 100 to 154; and Kent, from 62 to 96.

The larger number of cases of scarlet fever, 55, was contributed mainly by the four counties of Middlesex, Hertfordshire, Staffordshire, and Warwickshire, where increases of 15, 14, 22, and 17 respectively were recorded.

The notifications of diphtheria exceeded those of the previous week by only 24, but in Lancashire there was an increased incidence in the county boroughs (Liverpool C.B. from 66 to 80 cases).

A further decline, 48 cases, was recorded for whooping-cough. In contrast to the trend of the whole country there was an increase of 37 cases in Essex, of 17 in Middlesex, and of 18 in Wales.

Outbreaks of dysentery in Wales, where one-quarter of the total notifications occurred, were responsible for the increase recorded for this disease. They occurred in Glamorganshire, Cardiff C.B. 15 cases; and Carmarthenshire, Carmarthen M.B. 11 cases, Carmarthen R.D. 8 cases.

In *Scotland* there were rises in the incidence of cerebrospinal fever, diphtheria, and whooping-cough, and falls in the notifications of dysentery, measles, and scarlet fever. Fourteen further cases of typhoid were notified in Glasgow, where an outbreak affecting 8 persons began in the preceding week.

For *Eire* the feature of the returns was the large rise in the incidence of measles—to 142 from 97 in the preceding week. An outbreak in Co. Kerry, Killarney U.D. 58 cases, was mainly responsible for this. The City of Dublin recorded 51 cases, an increase of 30 over the previous week's total.

Vital Statistics

The returns for the 126 great towns of England and Wales suggest that the country has experienced a lower mortality rate during the first weeks of this year than in 1941. The number of deaths registered in the first six weeks of this year come to 34,771, which is much below the total of 44,053 for the corresponding period of 1941. Deaths among children aged 0-1 year were 2,432 in 1942 and 2,743 in 1941. Deaths attributed to influenza in 1942 numbered 445, compared with 1,050 in 1941. Large movements of the population from town to country could account for this difference; but, judging from the live births—31,844 in 1942 and 31,283 in 1941—no large-scale migration occurred. The returns for London show more striking differences between the two years than the aggregate of the great towns. In London 3,164 births and 5,433 deaths were registered during the first six weeks of 1942, compared with 2,101 births and 7,354 deaths in the corresponding period of last year. Deaths from violence, excluding suicide and road accidents, were 736 in 1941 and 147 in 1942. 655 deaths have been attributed to bronchitis in the first six weeks of this year in London, compared with 118 deaths in the corresponding period of last year.

Returns for the Week Ending February 21

The number of cases of infectious diseases notified during the week included scarlet fever 1,159, whooping-cough 1,211, diphtheria 855, measles 1,996, pneumonia 996, cerebrospinal fever 187, dysentery 137. In the great towns 62 deaths were attributed to influenza.

No. 6

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended February 14.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1942					1941 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	165	8	49	4	7	378	26	81	2	7
Deaths		1	4				7	7		
Diphtheria	944	30	210	38	32	1,175	50	343	18	32
Deaths	27	1	10	1	4	46	1	13	2	1
Dysentery	144	30	24		—	174	11	30		—
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	1	—	1		—	6	1	—		—
Deaths		—	—				—	—		
Enteric (typhoid and paratyphoid) fever						18	2	1	4	1
Deaths						2	—	1	—	—
Erysipelas			48	2	1			65	4	2
Deaths		—	—	—	—		—	—	—	—
Infective enteritis or diarrhoea under 2 years										
Deaths	37	9	10	—	1	36	1	5	1	3
Measles	1,793	152	124	142	18	16,654	387	177		18
Deaths	4	—	—	—	1	26	5	3	—	—
Ophthalmia neonatorum	72	4	29		—	62	3	20		1
Deaths					—					—
Paratyphoid fever	3	—	2	—						
Deaths	—	—	—	—						
Pneumonia, influenzal*	1,034	58	14	2	8	2,106	162	46	9	18
Deaths (from influenza)	75	9	5	1	1	324	50	24	4	5
Pneumonia, primary			339	26				411	15	
Deaths		67		7	9		130		19	18
Polio-encephalitis, acute	—	—				2	—			
Deaths		—					—			
Poliomyelitis, acute	1	—	1	3	—	12	1	—	—	—
Deaths	—	—	—			—	—	—		
Puerperal fever	154	11	9	3	2	1	1	6	—	2
Deaths		1					—			
Puerperal pyrexia	—	—	19		—	199	10	14		1
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,168	36	207	43	21	1,198	63	164	60	28
Deaths	—	—	—	—	—	3	—	1	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhoid fever†	10	1	15	2	2					
Deaths	—	—	—	—	—					
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	1,203	142	46	21	8	3,425	39	495		21
Deaths	6	4	—	—	—	38	3	17	1	—
Deaths (0-1 year)	389	52	89	29	23	469	36	86	37	24
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	5,895	881	814	239	156	7,734	1,330	912	243	208
Annual death rate (per 1,000 persons living)			18·3	16·0	‡			19·9	16·1	18·2
Live births	6,056	670	896	303	222	5,416	386	899	318	226
Annual rate per 1,000 persons living			18·5	20·2	‡			18·2	21·1	19·8
Stillbirths	251	20	39			213	21	42		
Rate per 1,000 total births (including stillborn)			42					45		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes paratyphoid A and B for Northern Ireland.

‡ Owing to evacuation schemes and other movements of population birth and death rates for Northern Ireland are no longer available.

Medical News

Prof. John Beattie, Conservator of the Museum of the Royal College of Surgeons of England, will give an address on "The Shock Problem" at St. Swithun's School, Morn Hill, Winchester, on Monday, March 9, at 3 p.m. All Service medical officers and civilian practitioners will be welcome.

Mr. Norman Patterson will deliver a lecture on "E.N.T. Conditions in Relation to the War" at the Weston Hotel, Bath, on Thursday, March 12, at 5.30 p.m. All Service medical officers and civilian practitioners will be welcome.

A meeting of the Pharmaceutical Society of Great Britain will be held at 17, Bloomsbury Square, W.C., on Thursday, March 12, at 2.30 p.m., when the following short papers will be read: "Variation in the Bactericidal Value of Lysol *B.P.*," by Messrs. H. Berry and J. B. Stenlake; "Displacement Value of Medicaments in Suppositories," by Messrs. W. T. Ostins and R. A. Roberts; "The Relative Needs of Young Male and Female Rats for Vitamin A," by Dr. Katharine H. Coward; "Volatile Liquids in Mixtures," by Mr. Donald Evans; "The Sterilization Processes in the Fourth *Addendum* to the *British Pharmacopoeia, 1932*," by Mr. H. Berry; and "The Pain Effects of Injections of Varying *p*H," by Mr. A. W. Lupton. An opportunity for discussion will be given after each paper.

A special Conference on Rehabilitation will be held at the Birmingham Accident Hospital (Bath Row, Birmingham) on Friday, March 13, at 8 p.m., when there will be a discussion on "Rehabilitation as it affects the Industrial Medical Officer," to be opened by Mr. William Gissane and Mr. E. A. Nicoll (Mr. Nicoll will also show a film). Medical practitioners (especially those with factory appointments) are invited to be present; also senior medical students.

A sessional meeting of the Royal Sanitary Institute will be held in co-operation with the Welsh Branch of the Society of Medical Officers of Health and the South Wales and Monmouthshire Centre of the Sanitary Inspectors Association, at Newport (Mon.) Town Hall on Saturday, March 14, at 11 a.m., when papers will be read by Mr. C. Matheson on "Some Animals and their Role in Public Health Matters," and by Mr. S. Dixon on "Food Adulteration in Wartime."

The annual congress of the Ophthalmological Society of the United Kingdom will be held in London on Friday and Saturday, May 29 and 30, if circumstances permit. Suggestions for the subject for discussion will be welcomed and should be sent to Mr. Frank W. Law, F.R.C.S., acting honorary secretary (36, Devonshire Place, London, W.1) as soon as possible.

A new benzyl benzoate application is about to be added to the *National War Formulary*. An amending slip will be sent to all doctors and chemists who are under contract with Insurance Committees. An emulsion is formed by the addition of lanette wax SX (of commerce) and water. The emulsion has been clinically tested on cases of scabies at the Sorby Research Institute and has given highly satisfactory results. Compared with the preparation of benzyl benzoate previously recommended it has the advantages of being less painful to the skin and of not requiring large quantities of rectified spirit and soft soap.

Sir Frederick Fry, the only surviving member of the original Distribution Committee of King Edward's Hospital Fund for London, has retired from the committee after forty-four years' membership, but retains his seat on the General Council of the Fund. He was present at the first meeting of the committee, held in Lord Lister's house in Park Crescent. In all, he has shared in the responsibility for the distribution of considerably over ten million pounds by the King's Fund.

Chile has established a National Service of Public Health to control all sanitary organizations concerned with prophylaxis and health protection.

The Board of Trade wish to point out that pneumonia jackets are not subject to rationing, and should therefore be supplied coupon-free.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

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QUERIES AND ANSWERS

Treatment of Threadworms

Dr. E. H. REINSBERG (Whitehaven) writes: The latest edition of Price's *Textbook of Medicine* recommends for the treatment of threadworms special gelatin-coated tablets of gentian violet, the adult dose being 1 grain thrice daily before meals for eight days; this course is repeated after a clear interval of seven days. It warns of toxic features—namely, anorexia, nausea, abdominal cramp, and vomiting. I have under treatment an unmarried neurasthenic woman of 33 who has so far failed to respond satisfactorily to other forms of treatment. She is now following a course of gentian violet plus the usual methods of cleansing finger-nails, etc. It is as yet too early to state the results. The drug was obtained (in pill form) by special request from Parke, Davis and Co.

Treatment of Chilblains

Dr. H. N. EDWARDS (Sheringham) writes: Internally thyroid extract does well in some cases. I have just seen a girl who has had chilblains for years who says that the thyroid extract I gave her has cured her trouble; it has also cured chilblains in another older woman. Thyroid alone seems to be satisfactory in these cases, but it is certainly not always successful. Locally I suggest roomy stockings (changed frequently) and shoes with spats or gaiters. Thin pieces of rubber or elastic strapping wound round the toes give a good deal of relief and even cure. A piece of animal wool put in the toes of the stockings completes the toilet. Frequent manipulation of the toes is desirable. For an application methyl salicylate relieves discomfort.

Income Tax

Private Income of Serving Officer

A. C. C. is serving with the R.A.F., and has untaxed private income from Irish Government securities and bank deposits. The Service pay is of course subjected to tax by deduction. How will the tax on the private income be assessed?

*** The fact that tax is deducted from the Service pay will not affect the mode of dealing with the private income, as such income is outside the scope of the authority dealing with Service pay.

LETTERS, NOTES, ETC.

Industrial Cancer

Dr. G. ARBOUR STEPHENS (Swansea) writes: I have read Dr. Brockbank's monograph, which you recently reviewed (December 13, 1941, p. 851), on *Mule Spinner's Cancer* with interest, especially as it contains one important statement and suffers from one serious omission. The statement occurs on page 6, where Wilson is quoted as saying that mule spinners in other countries do not suffer from the disease. Dr. Brockbank, with all his opportunities of referring to the International Labour Office, does not refute the statement, so one infers that such a statement is true. No attempt is made to explain why foreign workers are exempt. The omission has to do with the predisposition, whereby some men develop the disease and others do not. As one who has had a large experience in connexion with industrial cancer in patent fuel workers I have found that all those who suffer from pitch epithelioma have been exposed to small quantities of carbon monoxide gas over prolonged periods, the minimum period being about fifteen years. The men who develop the growths in the minimum period are C3 men, members of what I have called the "acid class," who are fed on poor food.